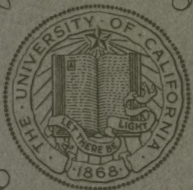
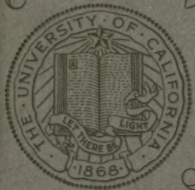
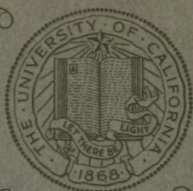
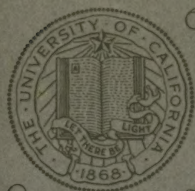




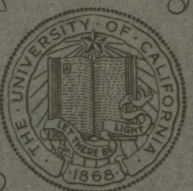
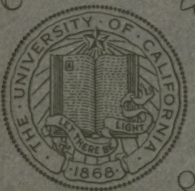
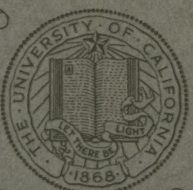
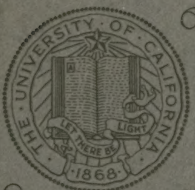


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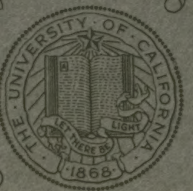
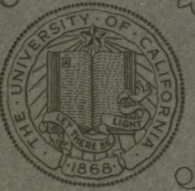
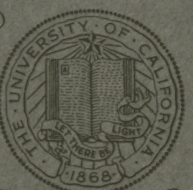
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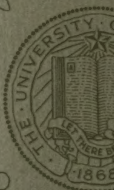
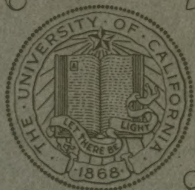
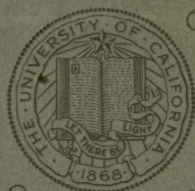
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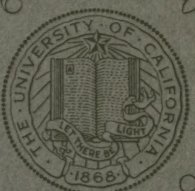
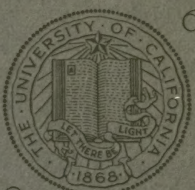
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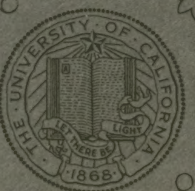
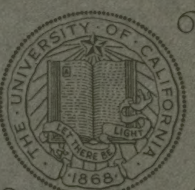
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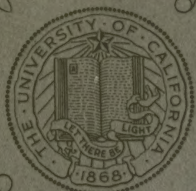
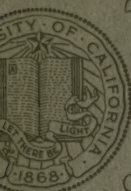
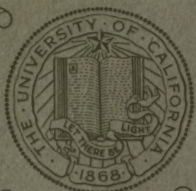


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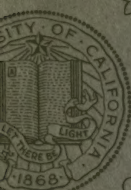
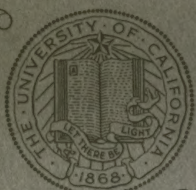
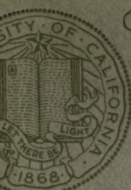
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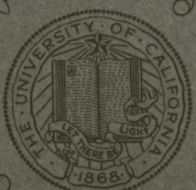
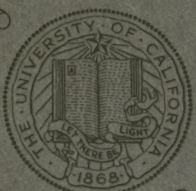
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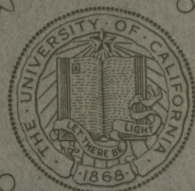
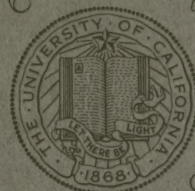
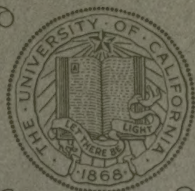
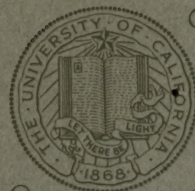
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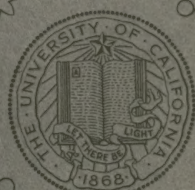
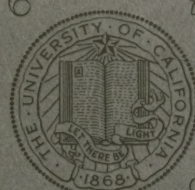
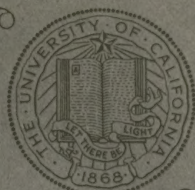
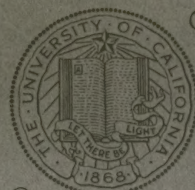
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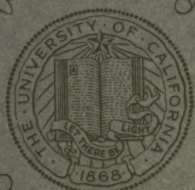
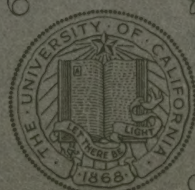
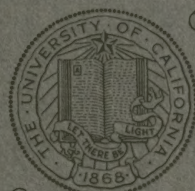
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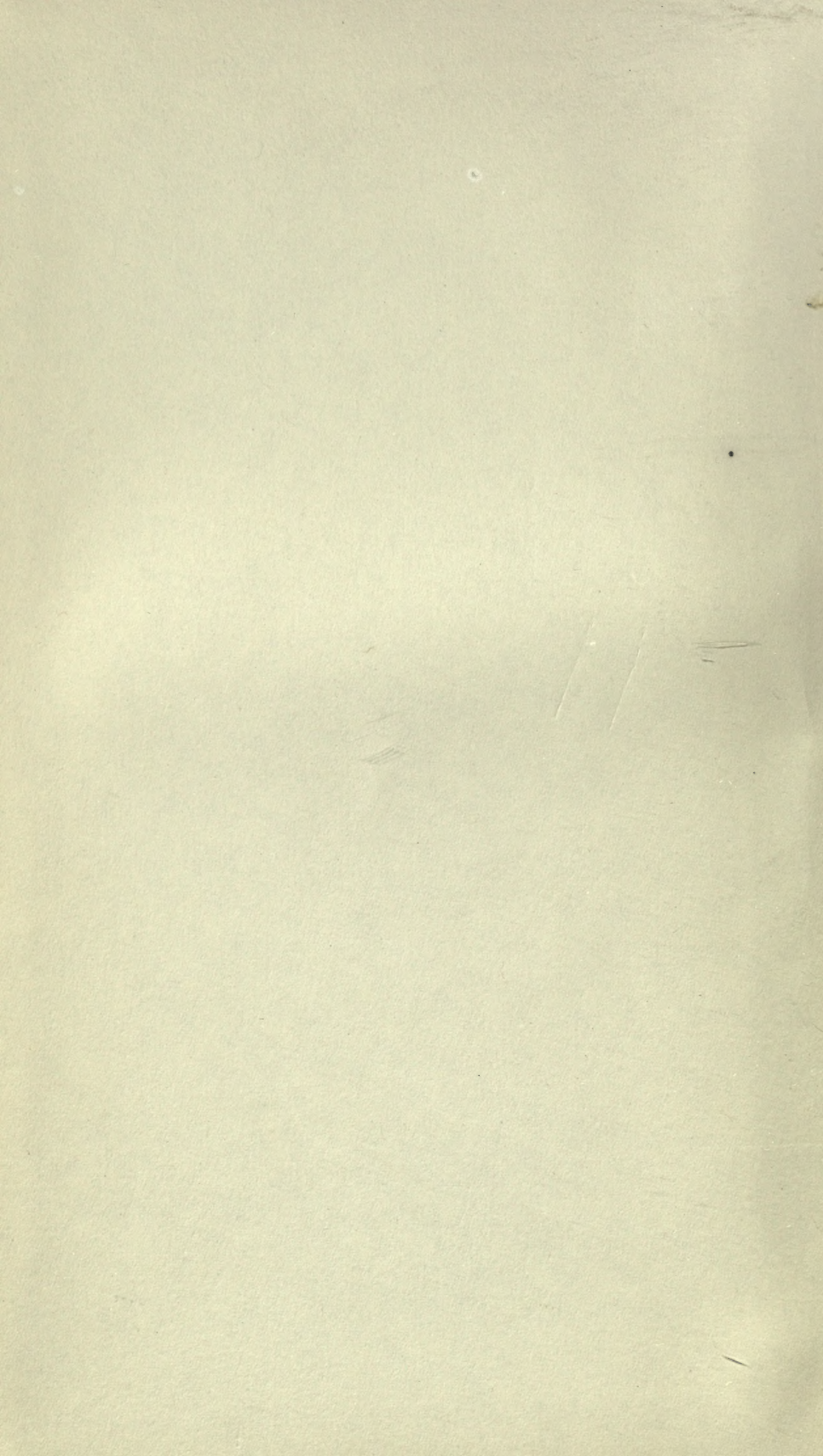
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SMITHSONIAN INSTITUTION  
UNITED STATES NATIONAL MUSEUM  
Bulletin 92

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BIBLIOGRAPHIC INDEX OF AMERICAN  
ORDOVICIAN AND SILURIAN  
FOSSILS

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VOLUME 1

BY

RAY S. BASSLER

*Curator of Paleontology, United States National Museum*



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1915







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## ADVERTISEMENT.

The scientific publications of the United States National Museum consist of two series—the *Proceedings* and the *Bulletins*.

The scientific publications of the United States National Museum are intended primarily as a medium for the publication of original, and usually brief, papers based on the collections of the National Museum, presenting newly acquired facts in zoology, geology, and anthropology, including descriptions of new forms of animals, and revisions of limited groups. One or two volumes are issued annually and distributed to libraries and scientific organizations. A limited number of copies of each paper, in pamphlet form, is distributed to specialists and others interested in the different subjects as soon as printed. The date of publication is printed on each paper, and these dates are also recorded in the tables of contents of the volumes.

The *Bulletins*, the first of which was issued in 1875, consist of a series of separate publications comprising chiefly monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal work, reports of expeditions, and catalogues of type-specimens, special collections, etc. The majority of the volumes are octavos, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable.

Since 1902 a series of octavo volumes containing papers relating to the botanical collections of the Museum, and known as the *Contributions from the National Herbarium*, has been published as bulletins.

The present work forms No. 92 of the *Bulletin* series.

RICHARD RATHBUN,

*Assistant Secretary, Smithsonian Institution,*

*In charge of the United States National Museum.*

WASHINGTON, D. C., July 21, 1915.

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## P R E F A C E.

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The literature of systematic natural history has become so voluminous that it is almost impossible for the student to attain good results without the aid of some kind of a compilation. In Paleozoic paleontology the need of such an index is perhaps greatest for the fossils of the Ordovician, Silurian, and Devonian periods for the reason that the Carboniferous has been covered up to 1898 by Weller's Bibliographic Index of North American Invertebrates (Bulletin 153, United States Geological Survey), and the numerous monographs of the Secretary of the Smithsonian Institution upon Cambrian geology and paleontology have assembled the fossils of that period. Dr. E. M. Kindle, while a member of the United States Geological Survey, prepared an index of Devonian fossils which will probably be published in the future. In the course of work upon the paleontologic collections of the United States National Museum the present author has specialized upon the Ordovician and Silurian, and it therefore became appropriate for him to prepare the bibliographic index which is herewith placed at the service of his fellow workers.

The great amount of labor required to complete an index of this size and character in a few years is very evident, and the work could not have been brought to a speedy conclusion had the author not had the help of two indefatigable and intelligent assistants, Miss Florence George and Miss Adelaide C. Quisenberry, to both of whom he is under great obligations. The refinement of stratigraphic designation consequent on the great advance in knowledge of Ordovician and Silurian stratigraphy in the last decade has necessitated a careful examination of all described fossils in order to locate them accurately in the time scale. In this work and also in the task of clearing up the synonyms the author is indebted to many friends for generous help, particularly to Dr. Rudolph Ruedemann, Mr. Frank Springer, Dr. P. E. Raymond, and Prof. W. H. Twenhofel. To Dr. E. O. Ulrich, whose knowledge of American Paleozoic paleontology and stratigraphy, whether in manuscript form or otherwise, has ever been at the command of the writer, he is under special indebtedness. The writer has also had access to a set of references to American Paleozoic fossils covering part of the literature up to 1906, prepared under the direction of Prof. Charles Schuchert by Miss M. W. Moodey and Mr. J. M. Nickles. This set was of greatest use for its foreign generic references, but in order to insure as few errors as possible these references were again checked up with the literature covered by them.

The terms Ordovician and Silurian in the title of this work are employed in a broad sense, so as to include formations which, although considered of Cambrian or Devonian age by some, are still placed in the Ordovician or Silurian by others. The particular cases in the Silurian are those of the upper Monroan and the Keyser formations, both of which the author would place in the Devonian. With the Ordovician the author has catalogued the Ozarkian and Canadian faunas, both of which divisions are regarded by Ulrich, Schuchert, Walcott, and others, the writer included, as of systemic value. In fact, then, the present index is intended to cover all American fossils which are known to occur in formations regarded as probably younger than those which are definitely decided to be of Cambrian age, and older than those now generally considered to belong to the Devonian period.



Every effort has been made to eliminate errors, but it is inevitable that many will be found. As the author intends to keep this index up to date for use in the United States National Museum, all corrections will be greatly appreciated. A chapter devoted to the literature of American Ordovician and Silurian paleontology was prepared for this work, but was omitted when it was found that this subject will be included in a forthcoming bibliographic publication by the United States Geological Survey.

The citations have been brought up to the close of 1914 with the exception that two important monographs (Schuchert, Revision of Paleozoic Stellerioidea, Bulletin 88, United States National Museum, and Springer, Monograph Crinoidea Flexibilia, Smithsonian Institution), then in press or ready for publication, were included.

Following the bibliographic list proper which makes up the greater part of the work (pages 1 to 1342), the author has added an index of specific names (pages 1343 to 1406), showing under what generic or other combination any particular name has been employed. Then, in order that the biological classification of any doubtful genus may be readily ascertained, a biological classification (pages 1407 to 1428) and an alphabetical list of genera (pages 1429 to 1440) are given. Finally, as an aid in recalling the position of the many geological formations cited, an alphabetical list of American Ordovician and Silurian formations, indicating their approximate place in the time scale (pages 1511 to 1521), and correlation tables covering the most important areas of fossiliferous rocks, are given. With the help of these several features, in addition to the bibliographic references, it is believed that all the needs of the student with one exception are covered. This exception is the failure to indicate the characteristic species of each formation in the faunal lists. As knowledge of the early Paleozoic faunas increases it is becoming more evident that a species is characteristic of a formation only in a certain area of deposition and when considered in connection with the associated organisms. As the origin of the fauna, the lithology of its inclosing sediments, and still other factors must also be considered in determining such species, it has not seemed advisable to attempt to indicate them at present.

The bibliographic citations are abbreviated as far as possible without sacrificing clearness, and the horizon and locality of each species are condensed into as few words as needed. The type locality is cited first, and in cases where a species occurs in several formations the name of the particular formation follows in parenthesis each locality listed. It will be noted that this index is also a register of the types of Ordovician and Silurian fossils contained in the United States National Museum. The type terms holotype, paratype, and cotypes, for primary types, and plesiotypes, for all supplemental types, employed throughout this work are those adopted in the division of paleontology in the United States National Museum. All valid species are printed in heavy-faced type. The cross references are condensed as much as possible, and in cases where the generic cross reference will suffice for the species under it, those for the latter are not given.



# BIBLIOGRAPHIC INDEX OF AMERICAN ORDOVICIAN AND SILURIAN FOSSILS.

BY RAY S. BASSLER

*Curator of Paleontology, United States National Museum.*

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## BIBLIOGRAPHIC LIST OF GENERA AND SPECIES.

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### **ACACOCRINUS** Wachsmuth and Springer.

Genotype: *A. elrodi* Wachsmuth and Springer.

*Acacocrinus* (subgenus of *Habrocrinus*) Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 515.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 730.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 194.

### **Acacocrinus americanus** Wachsmuth and Springer.

*Acacocrinus americanus* Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 516, pl. 34, fig. 15a, b.  
Niagaran (Laurel): St. Paul, Indiana.

### **Acacocrinus elrodi** Wachsmuth and Springer.

*Acacocrinus elrodi* Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 515, pl. 34, fig. 16.  
Niagaran (Waldron): Hartsville, Indiana.

### **ACANTHALOMA** Conrad. See *Ceratocephala* Warder.

### **ACANTHOCLEMA** Hall.

Genotype: *Trematopora alternata* Hall.

*Acanthoclema* Hall, 5th Ann. Rep. State Geol. New York for 1885, 1886, expl. pl. 25.—Hall and Simpson, Pal. New York, 6, 1887, p. 15.—Miller, N. A. Geol. Pal., 1889, p. 291.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 402, 661.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 552.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 44.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 58; Zittel-Eastman Textb. Pal., 1913, p. 344.

### **Acanthoclema asperum** (Hall).

*Trematopora aspera* Hall, Pal. New York, 2, 1852, p. 154, pl. 40 A, figs. 10a-c. *Batostomella? aspera* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 189. *Acanthoclema asperum* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 58, pl. 21, figs. 3-5; pl. 24, figs. 7-9; pl. 25, figs. 17-20.

Clinton: Lockport, Rochester, etc., New York; Grimsby, Hamilton, etc., Ontario (Rochester); Osgood, Indiana (Osgood).

*Plesiotypes*.—Cat. No. 35756, U.S.N.M.



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Clinton: Lockport, Rochester, etc., New York; Grimsby, Hamilton, etc., Ontario (Rochester); Osgood, Indiana (Osgood).

*Plesiotypes*.—Cat. No. 35756, U.S.N.M.

**ACANTHODICTYA** Hinde.Genotype: *A. hispida* Hinde.

*Acanthodictya* Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 47.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 666.—Dawson, Trans. Roy. Soc. Canada, 2d ser., 2, sec. 4, 1896, p. 110.

**Acanthodictya hispida** Hinde.

*Acanthodictya hispida* Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 48, figs. 18, 19, pl. 3, fig. 8.—Rauff, Palæontographia, 40, 1894, p. 255.—Dawson, Trans. Roy. Soc. Canada, 2d ser., 2, sec. 4, 1896, p. 110, figs. 20, 21, pl. 3, fig. 11.

Canadian? (Levis?): Metis, Quebec.

**ACANTHOGRAPTUS** Spencer.Genotype: *A. granti* Spencer.

*Acanthograptus* Spencer, Canadian Nat., n. s. 8, 1878, p. 461.—Lapworth Quart. Jour. Geol. Soc. London, 37, 1881, p. 174.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pp. 562, 581; Bull. Mus. Univ. State Missouri, 1, 1884, p. 31.—Miller, N. A. Geol. Pal., 1889, p. 170.—Ruedemann, Mem. New York State Mus., 9, 1908, p. 191.

**ACANTHOGRAPTUS BARTONENSIS** Grant. See *Acanthograptus walkeri*.

**Acanthograptus chaetophorus** Gurley.

*Acanthograptus chaetophorus* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1911, p. 61, fig. 84, pl. 3, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

**Acanthograptus granti** Spencer.

*Acanthograptus granti* Spencer, Canadian Nat., n. s., 8, 1878, p. 461; 10, 1882, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, p. 31, pl. 4, fig. 5; Trans. Acad. Sci. St. Louis, 4, 1884, p. 581, pl. 4, fig. 5.—Gurley, Jour. Geol., 4, 1896, pp. 92, 308.—Ruedemann, Mem. New York State Mus., 11 pt. 2, 1908, pl. 6, fig. 3; pl. 7, fig. 3.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 56, 57, figs. 72-74.

Niagaran dolomite: Hamilton, Ontario.

**Acanthograptus multispinus** Gurley.

*Acanthograptus multispinus* (Gurley MS.), Bassler, Bull. U. S. Nat. Mus., 65, 1911, p. 61, figs. 85, 86.

Niagaran dolomite: Hamilton, Ontario.

**Acanthograptus pulcher** Spencer.

*Acanthograptus pulcher* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Bull. Mus. Univ. State Missouri, 1, 1884, p. 32, pl. 4, fig. 6; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 582, pl. 4, fig. 6.—Miller, N. A. Geol. Pal., 1889, p. 170, fig. 128.—Gurley, Jour. Geol., 4, 1896, pp. 92, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 59, 60, figs. 81-83, pl. 4, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

**Acanthograptus walkeri** (Spencer).

*Inocaulis walkeri* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Bull. Mus. Univ. State Missouri, 1, 1884, p. 35, pl. 5, fig. 2; Trans. Acad. Sci. St. Louis, 4, 1884, p. 585, pl. 5, fig. 2.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.

*Acanthograptus walkeri* Ruedemann, Mem. New York State Mus., 11, 1908, p. 194, figs. 97, 98, pl. 6, figs. 1, 2; pl. 7, fig. 4.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 57-59, figs. 75-80.

*Acanthograptus bartonensis* Grant, Jour. and Proc. Hamilton Assoc., 16, 1900, p. 101 (fig. only).



**Acanthograptus walkeri**—Continued.

Niagaran dolomite: Hamilton, Ontario.

Clinton (Rochester): Middleport, New York.

*Plesiotype*.—Cat. No. 54277, U.S.N.M.

**ACANTHOLENUS** Matthew.

Genotype: *Leptoplastus spiniger* Matthew.

*Acantholenus* Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 142.

**Acantholenus spiniger** (Matthew).

*Leptoplastus spiniger* Matthew, Canadian Rec. Sci., 3, 1889, p. 487, fig. 4.

*Anomocare spiniger* Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 61, pl. 13, figs. 4a-e.

*Acantholenus spiniger* Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 142, pl. 2, figs. 4a-4e; Bull. Nat. Hist. Soc. New Brunswick, 16, 1898, p. 42.

Canadian (Bretonian, Div. C 3b): Long Island, Kennebecasis River, New Brunswick.

**ACANTHONEMA** Grabau.

Genotype: *A. holopiforme* Grabau.

*Acanthonema* Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 181.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691.

**Acanthonema holopiforme** Grabau.

*Acanthonema holopiformis* Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 182, pl. 16, fig. 4, pl. 26, figs. 1-3; pl. 23, figs. 6, 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691.

Upper Monroan: Wayne County, Mich., and Otsego, Wood County, Ohio (Lucas); Detroit River (Amherstburg).

**Acanthonema holopiforme obsoletum** Grabau.

*Acanthonema holopiformis* var. *obsoleta* Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 183, pl. 26, fig. 1, right half.

Upper Monroan (Lucas): Gibraltar quarry, Wayne County, Michigan.

**Acanthonema laxum** Grabau.

*Acanthonema laxa* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 183, pl. 26, fig. 4; pl. 27, figs. 3, 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691.

Upper Monroan: Grosse Island and Wayne County, Mich. (Lucas); Detroit River (Amherstburg).

**Acanthonema newberryi** (Meek).

*Orthonema newberryi* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1871, p. 81; Geol. Surv. Ohio, Pal. 1, 1873, p. 217, pl. 20, figs. 3a-b.—Miller, N. A. Geol. Pal., 1889, p. 414, fig. 690.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 566, fig.

*Acanthonema newberryi* Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 184, pl. 27, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691, fig. 985.

Upper Monroan (Lucas): Otsego, Wood County, Ohio.

**ACASTE** Goldfuss. See *Phacopidella* Reed.**ACERVULARIA** Schweigger.

Genotype: *A. baltica* Schweigger=*A. ananas* (Linnæus).

*Acervularia* Schweigger, Handb. der Naturg., 1820, p. 418.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 187.—Dana, Wilkes' U. S. Expl. Exped., 1838-42, 7, Zoophytes, 1846, p. 358; Amer. Jour. Sci. and Arts, 2d ser., 1, 1846, p. 184.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851

**ACERVULARIA**—Continued.

(Arch. Mus. Hist. Nat., 5, 1851), pp. 171, 414.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 457.—Hall, *Geol. Surv. Iowa*, 1, pt. 2, 1858, p. 476.—Milne-Edwards, *Hist. Nat. d. Corall.*, 3, 1860, p. 407.—Dybowski, *Archiv. f. Natur. Liv.-Ehst. und Kurl.*, 5, 1873, p. 338.—Zittel, *Handbuch Pal.*, 1, 1879, p. 233.—Roemer, *Leth. geog.*, pt. 1, *Leth Pal.*, 1883, p. 350.—Koch, *Palæontographica*, 29, 1883, pp. 330, 342.—Miller, *N. A. Geol. Pal.*, 1889, p. 170.—Sherzer, *Amer. Geol.*, 7, 1891, pp. 284-289.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 311, fig. 234.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 32, No. 1, 1899, p. 17.—Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 79.—Lambe, *Cont. Can. Pal.*, *Geol. Surv. Canada*, 4, pt. 2, 1901, p. 163.

**Acervularia austini** (Salter).

*Strephodes? Austini* Salter, *Sutherland's Jour. Voyage in Baffins Bay, etc.*, 2, 1852, p. cccxxx, pl. 6, figs. 6, 6a.—Etheridge, *Quart. Jour. Geol. Soc. London*, 1878, p. 587.—Woodward, *Geol. Mag.*, dec. 2, 5, 1878, p. 386, pl. 10, figs. 1, 2.

*Clisiophyllum austini?* Houghton, *Jour. Geol. Soc. Dublin*, 1, 1857, p. 246, pl. 10, figs. 2, 2a.

*Acervularia austini* Lambe, *The Cruise of the "Neptune," App.* 4, 1906, p. 322; *Cruise of the "Arctic" in 1908-9, 1910*, p. 479.

Niagaran: Cornwallis, Beechey and Griffith's Islands, and Cape Hilgard, Arctic America.

**Acervularia clintonensis** Nicholson.

*Acervularia clintonensis* Nicholson, *Geol. Surv. Ohio, Pal.* 2, 1875, p. 227, pl. 23, figs. 2, 2a.—Miller, *N. A. Geol. Pal.*, 1889, p. 170, fig. 129.

Upper Medinan (Brassfield?): Yellow Springs, Ohio.

**ACERVULARIA COMMUNIS** Simpson. See *Prismatophyllum inequalis*.

**Acervularia gracilis** (Billings).

*Strombodes gracilis* Billings, *Geol. Canada, Geol. Surv. Canada*, 1863, p. 306, fig. 309; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 113 (Adv. sheets, 1862).—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 190, fig.—Lesley, *Geol. Surv. Pennsylvania, Rep. P.* 4, 1890, p. 1109, fig.

*Acervularia gracilis* Lambe, *Ottawa Nat.*, 12, 1899, p. 221; *Cont. Can. Pal.*, *Geol. Surv. Canada*, 4, pt. 2, 1901, p. 163, pl. 14, figs. 2, 2a.

Upper Medinan (Cataract): Manitouaning, Grand Manitoulin Island, Lake Huron.

**ACERVULARIA INEQUALIS** Schuchert. See *Prismatophyllum inequale*.

**ACHRADOCRINUS** Schultze.

Genotype: *A. ventrosus* Schultze.

*Achradoocrinus* Schultze, *Denk. d. Kais. Akad. der Wiss., Math.-Naturw. Cl.* 24, Abth. 2, p. 213, fig. 19.—Zittel, *Handb. Pal.*, 1, 1879, p. 364.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1886, pp. 115, 151. (*Rev. Pal.*, pt. 3, sec. 2, pp. 191, 272).—Bather, *Ann. Mag. Nat. Hist.*, 6 ser., 5, 1890, p. 324, pl. 14, fig. 22; *Treatise on Zool.*, pt. 3, *Echinoderma*, 1900, p. 178, fig. 95.—Slocum, *Field Columbian Mus.*, 2, 1908, p. 287.—Zittel, *Handb. Pal.*, 1, 1910, p. 152.

**Achradoocrinus patulus** Slocum.

*Achradoocrinus patulus* Slocum, *Field Columbian Mus.*, 2, 1908, p. 288, pl. 85, figs. 1-4.

Niagaran (Racine): Romeo, Illinois.



**ACIDASPIS** Murchison.Genotype: *A. brightii* Murchison.

*Acidaspis* Murchison, Sil. Syst., 1839, p. 658.—Hall, Pal., 1 New York, 1847, p. 240.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 777; Syst. Sil. du Centre Boheme, 1, 1852, p. 692.—Salter, Mem. Geol. Surv. United Kingd., dec. 7, 1853, pl. 6.—McCoy, British Pal. Rocks and Fossils, 1854, p. 152.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 517.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 217.—Gebhard, Ninth Rep. New York State Cab. Nat. Hist., 1856, p. 46.—Chapman, Canadian Jour., n. s., 1, 1856, p. 282.—Salter, Cat. Camb. Sil. Foss., 1873, p. 134.—Steinhardt, Beit. z. Naturk. Preus. Phys.-Oekon. Gesell., Königsberg, 1874, p. 62.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 128, 129.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 33.—Walcott, Science, 3, 1884, p. 281.—Zittel, Handb. d. Pal., 2, 1885, p. 622.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7, ser., 33, 1885, p. 1.—Hall and Clarke, Pal. New York, 7, 1888, p. xxxv, fig.; p. xxxvi.—Whidborne, Mon. Devonian Fauna South England, 1, Pal. Soc., 1889, p. 11.—Clarke, 10th Rep. State Geol. New York for 1890, 1891, pp. 63, 67; 44th Rep. New York State Mus., 1892, pp. 93, 97.—Vogdes, Cal. Acad. Sci., Occ. Pap., 4, 1893, p. 259.—Beecher, Amer. Geol., 16, 1895, p. 178.—Koken, Die Leitfossilien, Leipzig, 1896, p. 31, fig. 20.—Oehlert, Bull. Soc. geol. France, 3d ser., 24, 1896, p. 112, text fig. 33.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 104, pl. 3, fig. 23.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, pp. 26, 35.—Miller, N. A. Geol. Pal., 1889, p. 526.—Cumings, Thirty-second Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1051.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 311.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 722.

Observation.—Most of the above references are to *Acidaspis* in a broad sense, including *Ceratocephala* and *Odontopleura*.

**ACIDASPIS ANCHORALIS** Miller. See *Ceratocephala anchoralis*.

**Acidaspis brevispinosa** Foerste.

*Acidaspis brevispinosa* Foerste, Geol. Surv., Ohio, 7, 1895, p. 522, pl. 37A, fig. 13. Upper Medina (Brassfield): Huffman Quarry, Dayton, Ohio.

**ACIDASPIS CERALEPTA** Meek. See *Ceratocephala ceralapta*.

**ACIDASPIS CINCINNATIENSIS** Meek. See *Ceratocephala cincinnatiensis*.

**ACIDASPIS CROSOTUS** Cumings. See *Odontopleura crosota*.

**ACIDASPIS DANAI** Hall. See *Ceratocephala goniata*.

**ACIDASPIS FIMBRIATA** Hall. See *Ceratocephala fimbriata*.

**ACIDASPIS HALLI** Shumard. See *Odontopleura halli*.

**ACIDASPIS HORANI** Billings. See *Ceratocephala horani*.

**ACIDASPIS IDA** Winchell and Marcy. See *Ceratocephala goniata*.

**Acidaspis obsoleta** Van Ingen.

*Acidaspis obsoleta* Van Ingen, School of Mines Quart., 23, 1901, p. 51, figs. 13, 14, pl., figs. 9, 10.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**ACIDASPIS O'NEALLI** Miller. See *Odontopleura o'nealli*.

**ACIDASPIS ORTONI** Foerste. See *Odontopleura ortonii*.

**ACIDASPIS PARVULA**. See *Odontopleura parvula*.

***Acidaspis perarmata* Whiteaves.**

*Acidaspis perarmata* Whiteaves, Canadian Rec. Sci., 4, 1891, p. 300, pl. 3, fig. 6;  
Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 289, pl. 42, fig. 3.  
Niagaran: Long Point, Lake Winnipegosis, Saskatchewan, Canada.

***Acidaspis quinquespinosa* Lake.**

*Acidaspis quinquespinosa* Lake, Quart. Jour. Geol. Soc. London, 52, 1896, p. 240,  
pl. 7, figs. 3, 4.—Van Ingen, School of Mines Quart., 23, 1901, p. 50, fig. 12,  
pl., figs. 7, 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 311, fig.  
1621h.

Silurian: Dudley, England (Wenlock); St. Clair Spring, Independence County,  
Arkansas (Niagaran-St. Clair).

**ACIDASPIS RHYNCOCEPHALUS** Meek. See *Ceratocephala cincinnatiensis*.

**ACIDASPIS SPINIGER** Hall. See *Bathyrurus spiniger*.

**ACIDASPIS TRENTONENSIS** Hall. See *Odontopleura trentonensis*.

***Acidaspis vanhornei* Weller.**

*Acidaspis vanhornei* Weller, Bull. Chicago Acad. Sci., 4, pt. 2, 1907, p. 251, pl. 23,  
figs. 3, 4.  
Niagaran (Racine): Bridgeport, Illinois.

**ACLEISTOCERAS** Hyatt. See *Poterioceras* McCoy.

**ACROCULIA** Phillips. See *Platyceras* Conrad.

***ACROTHELE* Linnarsson.**

Genotype: *A. coriacea* Linnarsson.

*Acrothele* Linnarsson, Bihang till K. svensk. Vet.-Akad. Handl., 3, No. 12, 1876,  
pp. 20-21.—Zittel, Handbuch d. Pal., 1, Abth. 1, 1880, p. 665.—Davidson,  
British Foss. Brach., 5, pt. 2, 1883, pp. 213-214.—Walcott, Bull. U. S. Geol.  
Surv., 30, 1886, pp. 107-108.—Ehlert, Man. Conch., 1887, p. 1269.—Hall and  
Clarke, 11th Ann. Rep. State Geol. New York, 1892, pp. 249, 250; 45th Ann.  
Rep. New York State Mus., 1892, pp. 565, 566; Pal. New York, 8, pt. 1, 1892,  
pp. 98-101.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 308.—Mat-  
thew, Geol. Surv. Canada, Rep. Cam. Rocks Cape Breton, 1903, pp. 103-105.—  
Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 200.—Walcott, Smiths.  
Misc. Coll., 53, 1908, pp. 142 and 146; Mon. U. S. Geol. Surv., 51, 1912, p. 630.

***Acrothele levisensis* Walcott.**

*Acrothele levisensis* Walcott, Smithsonian Misc. Coll., 53, No. 3, 1908, p. 85, pl. 8,  
fig. 13; Mon. U. S. Geol. Surv., 51, 1912, p. 646, pl. 81, figs. 12, 12a, b.  
Canadian (Levis, Didymograptus zone): Point Levis, Quebec.

***Acrothele pretiosa* (Billings).**

*Obolella pretiosa* Billings, Pal. Foss., 1, 1862, p. 68, fig. 61; Geol. Canada, 1863,  
p. 230, fig. 239.—Chapman, Canadian Jour., n. s., 8, 1864, p. 191, fig. 160c.;  
Expos. Min. Geol. Canada, 1864, p. 163, fig. 160b.—Walcott, Bull. U. S. Geol.  
Surv., 30, 1886, p. 111.

*Billingsia pretiosa* Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 467 (gen. ref.).

*Elkania pretiosa* Ford, Amer. Jour. Sci., 3d ser., 32, 1886, p. 325 (gen. ref.).

*Linnarssonia pretiosa* Schuchert (part) Bull. U. S. Geol. Surv., 87, 1897, p. 262.—  
Walcott, Proc. U. S. Nat. Mus., 23, 1901, p. 673.—Grabau and Shimer, Index  
Fossils, 1, 1907, p. 200.

*Acrothele pretiosa* Walcott, Proc. U. S. Nat. Mus., 21, 1898, p. 402; Mon. U. S.  
Geol. Surv., 51, 1912, p. 652, pl. 58, figs. 1, 1a-g.



**Acrothele pretiosa**—Continued.

Canadian: Chaudiere River at Grand Trunk Rail Road Bridge, Cape Rouge above Quebec, Canada (Sillery); near Grenville, Washington County, New York; Point Levis, Quebec (Levis, *Didymograptus* zone).

*Plesiotype*.—Cat. No. 52004 U.S.N.M.

**Acrothele rotunda** (Nicholson).

*Dawsonia rotunda* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 141, fig. 3a, b.

Canadian (Levis, *Diplograptus dentatus* zone): Point Levis, Quebec.

**ACROTRETA** Kutorga.

Genotype: *A. subconica* Kutorga.

*Acrotreta* Kutorga, Verhandl. Russ.-kais Min. Gesell. St. Petersburg for 1847, No. 12, 1848, pp. 259, 260.—Morris, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, pp. 316, 318.—Davidson, Brit. Fossil Brach., 1, Introduction, No. 3, 1853, p. 133.—Von Seebach, Zeits. d. d., geol. Gesell., 17, Hft. 2, 1865, p. 341.—Davidson, British Foss Brach., 3, pt. 7, No. 4, 1871, p. 343.—Dall, Bull. U. S. Nat. Mus., 8, 1877, p. 12.—Zittel, Handb. Pal., 1, Abth. 1, 1880, p. 666.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, pp. 16–17.—Ehler, Man. Conch., 1887, p. 1266.—Hall and Clarke, 11th Ann. Rep. State Geol. New York, 1892, p. 250.—45th Ann. Rep. New York State Mus., 1892, p. 566; Pal. New York, 8, pt. 1, 1892, pp. 101–104.—Schuchert, Zittel-Eastman, Textb. Pal., 1, 1900, p. 308.—Matthew, Bull. Nat. Hist. Soc. New Brunswick, 4, pt. 5, 1902, p. 390; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 94–97.—Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 199.—Walcott, Smithsonian Misc. Coll., 53, 1908, pp. 142, 146; Mon. U. S. Geol. Surv., 51, 1912, p. 671.

*Linnarssonina* Walcott, Amer. Jour. Sci., 3d ser., 29, 1885, p. 115.—Matthew, Trans. Royal Soc. Canada, 1st ser., 3, sec. 4, 1886, p. 35.—Dawson, Trans. Royal Soc. Canada, 1st ser., 7, sec. 4, 1890, pp. 53–54.—Hall and Clarke, 11th Ann. Rep. State Geol. New York, 1892, p. 251; 45th Ann. Rep. New York State Mus., 1892, p. 567; Pal. New York, 8, pt. 1, 1892, pp. 107–109.—Matthew, Trans. Royal Soc. Canada, 1st ser., 9, sec. 4, 1892, p. 42.

**ACROTRETA ATTENUATA** Meek (part). See *Acrotreta idahoensis*.

**ACROTRETA BAILEYI** Matthew. See *Acrotreta bisecta*.

**Acrotreta belti** (Davidson?) (Matthew).

?*Obolella belti* Davidson, Geol. Mag., 5, 1868, p. 310, pl. 15, figs. 25–27.

*Linnarssonina belti*? Matthew, Trans. Royal Soc. Canada, 1st ser., 9, sec. 4, 1892, pp. 42, 43, pl. 12, figs. 7a–c; Geol. Surv. Canada, Rep. Cambrian rocks Cape Breton, 1903, p. 209, pl. 16, fig. 3a–c.

Lower Tremadoc shales: North Wales.

Canadian (Bretonian—Div. C. 3 c): St. John, New Brunswick.

**Acrotreta bisecta** Matthew.

*Acrotreta baileyi* Matthew, Trans. Royal Soc. Canada, 1st ser., 9, sec. 4, 1892, p. 43, pl. 12, fig. 7d.

*Acrotreta bisecta* Matthew, Bull. Nat. Hist. Soc. New Brunswick, 4, pt. 4, 1901, pp. 275–276, pl. 5, figs. 5a–g; *ibid.*, pt. 5, 1902, p. 394, pl. 16, figs. 2a–g.—Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 582.—Matthew, Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, pp. 186–187, pl. 11, figs. 5a–g.—Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 298–299; Mon. U. S. Geol. Surv., 51, 1912, p. 678, pl. 66, figs. 7, 7a–e.

**Acrotreta bilsecta**—Continued.

*Acrotreta sipo* Matthew, Bull. Nat. Hist. Soc. New Brunswick, 4, pt. 5, 1902, pp. 406-407, pl. 18, figs. 1, 2; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, pp. 185-186, pl. 18, figs. 1, 2.

Canadian (Bretonian—Div. C. 3 c): McLeod Brook, Cape Breton, Nova Scotia, and Navy Island, St. John Harbor, New Brunswick.

**Acrotreta?? cancellata** Walcott.

*Acrotreta?? cancellata* Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 299; Mon. U. S. Geol. Surv., 51, 1912, p. 679, pl. 79, figs. 5, 5a.

Canadian (Lower Pogonip): Roundtop Mountain, Eureka County, Nevada.

**Acrotreta convexa** Walcott.

*Acrotreta convexa* Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 584; Mon. U. S. Geol. Surv., 51, 1912, pl. 66, figs. 6, 6a-c.

Canadian (Bretonian—Div. C. 3 c): Salmon River, thirteen miles south of Marion Bridge, etc., Cape Breton, Nova Scotia.

**Acrotreta curvata** Walcott.

*Acrotreta gemma* Walcott (not Billings) (part), Mon. U. S. Geol. Surv., 8, 1884, pp. 17, 18, pl. 1, figs. 1d, 1e (not figs. 1a-c, f); 10th Ann. Rep. U. S. Geol. Surv., 1891, p. 608, pl. 67, fig. 5b (not figs. 5a-e).—Hall and Clarke (part), Pal. New York, 8, pt. 1, 1892, p. 102, fig. 55 (not figs. 56, 57).—Walcott (part), Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 499, pl. 62, fig. 2e (not figs. 2, 2a-d).

*Acrotreta curvata* Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 584; Mon. U. S. Geol. Surv., 51, 1912, p. 682, pl. 68, figs. 1a-n.

Canadian (Lower Pogonip): Hamburg Ridge, Eureka District, Eureka County, Nevada. Also in Upper Cambrian of Oklahoma.

*Holotype* and *paratypes*.—Cat. No. 35269, U.S.N.M.

**Acrotreta gemma** Billings.

*Acrotreta gemma* Billings, Geol. Surv. Canada, Pal. Fossils, 1, 1865, pp. 216, 217, figs. 201a-f.—Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 685, pl. 66, figs. 1a-b.

Canadian (Quebec—P.): Four miles northeast of Portland Creek, Newfoundland.

**ACROTRETA GEMMA** Walcott. See *Acrotreta curvata* and *A. idahoensis alta*.

**Acrotreta idahoensis** Walcott.

*Acrotreta attenuata* Meek (part), 6th Ann. Rep. U. S. Geol. and Geog. Surv. Terr. for 1872, 1873, p. 463, footnote.

*Acrotreta idahoensis* Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 587; Mon. U. S. Geol. Surv., 51, 1912, p. 687, pl. 65, figs. 1a-i; pl. 68, figs. 2a-g.

Canadian (Lower Pogonip): East of Hamburg Ridge, etc., Eureka County, Nevada. Also Upper and Middle Cambrian of Utah, Montana, etc.

*Holotype* and *paratypes*.—Cat. Nos. 52089, 52091, U.S.N.M.

**Acrotreta idahoensis alta** Walcott.

*Acrotreta gemma* Walcott (not Billings) (part), Mon. U. S. Geol. Surv., 8, 1884, pp. 17, 18, pl. 1, figs. 1a, 1b (not figs. 1c-f); pl. 9, figs. 9, 9a; 10th Ann. Rept. U. S. Geol. Surv., 1891, p. 608, pl. 67, figs. 5, 5a (not figs. 5b-e).—Hall and Clarke (part) Pal., New York, 8, pt. 1, 1892, p. 102, figs. 56, 57 (not fig. 55).—Walcott, (part), Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 499, pl. 62, figs. 2a, 2c (not figs. 2, 2b, 2d, 2e).

*Acrotreta idahoensis alta* Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 588; Mon. U. S. Geol. Surv., 51, 1912, p. 689, pl. 65, figs. 4-4b.



**Acrotreta Idahoensis alta**—Continued.

Canadian (Base of Pogonip): Adams Hill, Eureka County, Nevada. Also Middle and Upper Cambrian of Montana, Utah, and Nevada.

*Holotype* and *paratype*.—Cat. Nos. 35273, 52099 U.S.N.M.

**ACROTRETA MINUTA** Walcott. See *Linnarssonella minuta*.

**Acrotreta ovalis** Walcott.

*Acrotreta ovalis* Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 592; Mon. U. S. Geol. Surv., 51, 1912, p. 699, pl. 66, figs. 2, 2a-b.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

**ACROTRETA SIPO** Matthew. See *Acrotreta bisecta*.

**ACTINOCERAS** Bronn.

Genotype: *A. bigsbyi* Bronn.

*Actinoceras* Bronn, Leth. geog., 1837, p. 97.—Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 707.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 11.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 3.—Woodward, Man. Mollusca, pt. 1, 1851, p. 88, fig. 47.—Saemann, Palæontographica, 3, 1852, pp. 137, 145, 156.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 638.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, pt. 1, 1855, p. 458; Neues Jahrb. f. Min., etc., 1855, p. 395.—Woodward, Geol. Mag., 5, 1868, p. 133.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1879, p. 760.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 272.—Zittel, Handb. Pal., 2, 1884, p. 368.—Foord, Geol. Mag., dec. 3, 5, 1888, p. 487; Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 164.—Miller, N. A. Geol. Pal., 1889, p. 431.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 119.—Bather, Nat. Sci., 5, 1894, pp. 431, 434, fig. 6.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 781.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 528.—Foord, Mon. Carb. Ceph. Ireland, pt. 5, Pal., Soc., App., 1903, p. 211.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 114.—Hyatt, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 609.

*Ormoceras*. Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 709.—Woodward, Man. Mollusca, pt. 1, 1851, p. 88, fig. 48.—Saemann, Palæontographica, 3, 1852, pp. 146, 156.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, pp. 326, 328.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 400.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 150.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, pt. 1, 1855, p. 470.—Chapman, Canadian Jour., n. s., 8, 1863, p. 20; Expos. Min. Geol. Canada, 1864, p. 128.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 765.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 271.—Zittel, Handb. Pal., 2, 1884, p. 368.—Miller, N. A. Geol. & Pal., 1889, p. 445.—(Genotype: *O. bayfieldi* Stokes).

*Paractinoceras* (subgenus of *Actinoceras*) Hyatt, Zittel-Eastman Textb. Pal., 1900, p. 528 (Genotype: *Sactoceras canadense* Whiteaves).

*Deiroceras* (subgenus of *Actinoceras*) Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 273 (Genotype: *Orthoceras python* Billings).

*Conotubularia* Troost, Mem. Soc. Geol. France, 3, 1838, p. 87; 5th Geol. Rep. Tennessee, 1840, p. 5.—Saemann, Palæontographica, 3, 1852, p. 146.—Barrande, Syst. Sil. Boheme, 2, pt. 3, 1874, p. 767. (Genotype: *C. cuvierii* Troost.)

**Actinoceras abnorme** (Hall).

*Orthoceras abnorme* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 355, pl. 18 (9), fig. 10; rev. ed. 1868 (1870), p. 415, pl. 18, fig. 10; pl. 25, fig. 18.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 756, pl. 456.—Day, Trans. Wisconsin Acad. Sci., Arts Letters, 4, 1879, p. 120.

**Actinoceras abnorme**—Continued.

Orthoceras (Actinoceras) abnorme Zittel, Handb. Pal., 2, 1884, p. 367, fig. 506.

Actinoceras abnorme Ruedemann, Bull. New York State Mus., 80, 1905, p. 332, fig. 22.

Niagaran (Racine and Guelph): Racine, etc., Wisconsin.

**ACTINOCERAS ALLUMETTENSE** Whiteaves. See *Loxoceras allumettense*.

**Actinoceras anticostiense** (Billings).

Orthoceras Anticostiense, Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1857, p. 316; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 22 (loc. ref.).—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 731, pl. 434.

Richmond and Gamachian: Charleton Point, etc., Anticosti.

**Actinoceras backi** (Stokes).

Orthocerae — Bigsby, Trans. Geol. Soc. London, 1, pt. 2, 1824, p. 204, pl. 30, fig. 1.

Orthoceras Backii Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689.

Orthoceras nummularium Etheridge (not Sowerby), Quart. Jour. Geol. Soc. London, 34, 1878, p. 608.

Actinoceras Backi Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 182.

Niagaran: Drummond Island, Lake Huron; Cape Louis Napoleon, Smith Sound, and Bessels Bay, Kennedy Channel, Arctic America.

Observation.—See *Actinoceras rotulatum* (Billings) for a possible synonym.

**Actinoceras bayfieldi** (Stokes).

Ormoceras Bayfieldii Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689 (nom. nud.); Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 709, pl. 40, fig. 1.—Woodward, Man. Mollusca, pt. 1, 1851, p. 88, footnote, fig. 48.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 470, pl. A, fig. 5; Neues Jahrb. f. Min., etc., 1855, p. 408, pl. 6, fig. 5.—Miller, N. A. Geol. Pal., 1889, p. 445, fig. 749.

Orthoceras Bayfieldi Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 738, pl. 231.

Orthoceras (Ormoceras) Bayfieldi, Zittel, Handb. Pal., 2, 1884, p. 368, fig. 507.

Niagaran: Drummond Island, Lake Huron.

**Actinoceras beaumonti** Castelnau.

Actinoceras Beaumonti Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 32, pl. 6, fig. 1.

Niagaran: Drummond Island, Lake Huron.

**Actinoceras beloitense** (Whitfield).

Orthoceras (Actinoceras) Beloitense Whitfield, Ann. Rep. Geol. Surv. Wisconsin, for 1877, 1878, p. 77; Geol. Wisconsin, 4, 1882, p. 226, pl. 8, fig. 1; pl. 10, figs. 9, 10.

Orthoceras Beloitense Chamberlin, Geol. Wisconsin, 1883, p. 159, figs.

Actinoceras beloitense Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 782, pl. 47, fig. 18.—Holtedah. Vidensk. Skrifter, 1, No. 9, 1912, p. 8, pl. 4, fig. 2.

Orthocerae — Bigsby, Trans. Geol. Soc. London, 1, pt. 2, 1824, p. 198, pl. 25, fig. 3 (not 1, 2).

Actinoceras Bigsbyi, Stokes (part) Trans. Geol. Soc. London, 2d ser., 5, pt. 3, 1840, p. 707.

Orthoceras (Ormoceras) Backii? Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 298, pl. 1, fig. 4.—Barrande, Syst. Sil. Centre Boheme, 2, text 4, 1877, p. 264, pl. 474, fig. 11.

Black River (Platteville): Beloit and Janesville, Wisconsin; Thessalon Island, Lake Huron; Arctic America.



**Actinoceras beudanti** Castelnau.

Actinoceras Beudanti Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 34, pl. 6, fig. 2.

Niagaran: Drummond Island, Lake Huron.

**Actinoceras bigsbyi** Bronn.

Orthoceras — Bigsby, Trans. Geol. Soc. London, 1, 1824, p. 198, pl. 25, figs. 1, 2 (not 3).

Actinoceras Bigsbyi Bronn, Leth. Geog., 1, 1837, p. 98, pl. 1, fig. 8.—Stokes, Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 707.—Seamann, Palæontographica, 3, 1852, p. 142.—Foord, Cat. Ceph. British Mus., 1, 1888, p. 168.—Whiteaves, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 84, pl. 10, fig. 2; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 208.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 781, pl. 47, figs. 15–17.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 115, fig. 1350.

Orthoceras bigsbyi Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 149, fig. 109a, b, and App., p. 949.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 543, figs.

Orthoceras (Actinoceras) Bigsbyi Barrande, Neues Jahrb. f. Min., etc., 1855, p. 400, Syst. Sil. du Centre Boheme, 1, pt. 3, 1874, p. 734, pl. 231, figs. 4, 5; pl. 437, figs. 10–16.—Roemer, Leth. geog., 1, Leth. Pal., 1876, pl. 16, fig. 7.

Actinoceras Lyonii Stokes, Trans. Geol. Soc. London, 2d ser., 5, pt. 3, 1840, p. 707, pl. 59, fig. 1.—Castelnau, Syst. Sil. de l'Amerique Septent., 1843, p. 32, pl. 17, figs. 1a–b.

Ormoceras Lyonii Hector, Quart. Jour. Geol. Soc. London, 17, 1861, p. 439.

Conoceras angulosum Saemann, Palæontographica, 3, 1852, p. 144.

Black River: Thessalon Island, Lake Huron; New York; Ontario; Manitoba; Kentucky; Tennessee; Minnesota; Arctic America, etc.

ACTINOCERAS BIGSBYI Stokes (part). See Actinoceras beloitense.

**Actinoceras blainvillei** Castelnau.

Actinoceras Blainvillei Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 31, pl. 5, fig. 1; pl. 8, fig. 1.

Niagaran: Little Manitoulin Island, Lake Huron.

**Actinoceras (Paractinoceras) canadense** (Whiteaves).

Sactoceras Canadense Whiteaves, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 85, pl. 10, figs. 1a–c.

Orthoceras Canadense Miller, N. A. Geol. Pal., 1st App., 1892, p. 697.

Actinoceras (Sactoceras?) Canadense Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 210.

Paractinoceras Canadense Hyatt, Zittel-Eastman Textbook Pal., 1900, p. 528.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 344.

Black River or Richmond: Lake Winnipeg, Manitoba.

ACTINOCERAS CAPITOLINUM Foord. See Actinoceras curvieri.

**Actinoceras clouei** (Barrande).

Orthoceras clouei Barrande, Syst. Sil. du Centre Boheme, ser. 2, 1870, pl. 432, figs. 1–6; pl. 433, figs. 1, 2; pl. 434, figs. 1–5.

Ordovician: Newfoundland.

**Actinoceras cordieri** Castelnau.

Actinoceras Cordieri Castelnau, Essai Syst. Sil. l'Amerique Septent., 1883, p. 31, pl. 5, fig. 2.

Niagaran: Great Manitoulin Island, Lake Huron.

**Actinoceras crebriseptum** (Hall).

*Ormoceras crebriseptum* Hall, Pal. New York, 1, 1847, p. 313, pl. 86, fig. 2a; pl. 87, figs. 2a-e.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 821, fig. 621.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 504, fig.

*Actinoceras crebriseptum* D'Orbigny, Prodr. Pal., 1, 1849, p. 3 (gen. ref.).—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 173.

*Orthoceras crebriseptum* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 218, fig. 228.—Chapman, Canadian Jour. n. s., 8, 1863, p. 206, fig. 208; Expos. Min. Geol. Canada, 1864, p. 178, fig. 208.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 546, figs.

*Orthoceras* (*Ormoceras*) *crebriseptum* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 739, pl. 434, figs. 6-8.

Cincinnatian (Pulaski): Turin, Pulaski, etc., New York.

**Actinoceras(?) cuvieri** (Troost).

*Conotubularia Cuvierii* Troost, Mem. Soc. Geol. France, 3, 1838, p. 88, pl. 9, fig. 1; 5th Geol. Rep. Tennessee, 1840, p. 48; 6th Geol. Rep. Tennessee, 1841, p. 176.

*Actinoceras Cuvieri* D'Orbigny, Prodr. Pal., 1, 1849, p. 3 (gen. ref.).

*Orthoceras cuvieri* Miller, N. A. Geol. Pal., 1889, p. 447 (gen. ref.).

*Orthoceras Capitolinum* Safford, Geol. Tennessee, 1869, p. 290, pl. 4 (G. 3), figs. 1a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 544, figs.

*Actinoceras capitolinum* Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 174.

*Jovellania capitolinum* Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 327 (gen. ref.).

Trenton (Bigby): Nashville, Tennessee.

**Actinoceras daytonense** (Foerste).

*Orthoceras* (*Actinoceras*) *Daytonensis* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 286, pl. 8, fig. 6; Geol. Surv. Ohio, 7, 1893, p. 539, pl. 33, fig. 6.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

**Actinoceras deshayesi** Castelnau.

*Actinoceras Deshayesii* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 32, pl. 8, fig. 4.

Silurian: Green Bay, Lake Michigan.

**Actinoceras distans** (Hall).

*Endoceras distans* Hall, Pal. New York, 1, 1847, p. 220, pl. 58, figs. 1a, b.

*Actinoceras distans* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 1, 1898, p. 58 (gen. ref.).

Trenton: Turin, Lewis County, New York.

**Actinoceras dufresnoyi** Castelnau.

*Actinoceras Dufresnoyi* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 32, pl. 8, fig. 3.

Niagaran: Drummond Island, Lake Huron.

**Actinoceras fulgur** (Billings).

*Orthoceras propinquum* Billings (not Eichwald), Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 320.

*Orthoceras fulgur* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 22.

Richmond (Charleton): Charleton Point, Anticosti.



**Actinoceras gracile** (Hall).

Ormoceras? gracile Hall, Pal. New York, 1, 1847, p. 58, pl. 17, fig. 3.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 504, fig.

Actinoceras gracile D'Orbigny, Prodr. Pal., 1, 1849, p. 3 (gen. ref.).

Hormoceras? gracile Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 601 (gen. ref.).

Black River (Watertown): Watertown, New York.

**Actinoceras hearsti** Parks.

Actinoceras hearsti Parks, in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 37. Niagaran (Guelph): Severn River, Ontario.

**Actinoceras infelix** (Billings).

Orthoceras infelix Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 57.

Actinoceras (Orthoceras) infelix Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 272.

Anticostian (Bessie River-Jupiter River): Southwest Point, Anticosti.

**Actinoceras keewatinense** Whiteaves.

Actinoceras Keewatinense Whiteaves, Ann. Rep. Geol. Surv. Canada (n. s.), 14, App. F, 1904, p. 54; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, pp. 246, 263, pl. 30, figs. 7, 8.

Niagaran: Rainy Island, Attawapiskat River and Ekwan River, Canada.

**Actinoceras latonummulatum** (Foerste).

Orthoceras (Actinoceras) lata-nummulatus Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 285, pl. 8, fig. 4; Geol. Surv. Ohio, Pal. 7, 1893, p. 538, pl. 33, fig. 4.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

**ACTINOCERAS LYONI** Stokes. See *Actinoceras bigsbyi*.

**ACTINOCERAS LYONI** Whiteaves. See *Actinoceras richardsoni*.

**Actinoceras (Deiroceras) python** (Billings).

Orthoceras python Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 335.

Deiroceras python Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 273 (gen. ref.).

Actinoceras (Deiroceras) python Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 210.

Trenton: Ottawa, Montreal and Lake Winnipeg, Canada.

**Actinoceras remotiseptum** (Hall).

Ormoceras remotiseptum Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 181, pl. 4, fig. 3. (Doc. ed., p. 173).

Actinoceras remotiseptum Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 782, pl. 54, figs. 1-3.—Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 172.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 115.

Hormoceras remotiseptum Clarke and Ruedemann, New York State Mus., Bull. 65, p. 602 (gen. ref.).

Black River: Watertown, New York (Watertown); Cannon Falls, Minnesota (Platteville).

**Actinoceras richardsoni** Stokes.

Actinoceras Richardsonii Stokes, Proc. Geol. Soc. London, 2, p. 689 (nom. nud.); Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 708, pl. 59, figs. 2, 3.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 30, pl. 7, figs. 1, 2; pl. 8, figs.

**Actinoceras richardsoni**—Continued.

2a, b.—Woodward, Man. Mollusca, pt. 2, 1851, p. 88, footnote, fig. 47.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 396, pl. 6, figs. 6, 7; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 461, pl. B, figs. 6, 7.—Foord, Cat. Foss. Ceph. Brit. Mus., pt. 1, 1888, p. 172.—Miller, N. A. Geol. Pal., 1889, p. 431, text fig. 725.—Whiteaves, Trans. Royal Soc. Canada, 9, sec. 4, p. 83, pl. 9, figs. 1, 2, 2a, 3, 4a; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 207.

*Orthoceras richardsoni* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 737, pl. 234.

?*Ormoceras Brongniarti* Owen, Geol. Rep. Wisconsin, Iowa, Minnesota, 1852, p. 181.

*Actinoceras Lyoni* Whiteaves (not Stokes), Geol. Surv. Canada, Rep. Progr. 1878-79, 1880, pp. 460, and 48c of Appendix 1.

Black River or Richmond: Lake Winnipeg, Canada.

**Actinoceras richardsoni magnum** Parks.

*Actinoceras richardsoni* var. *magnum* Parks in Tyrrell, 22nd Rep. Ontario Bur. Mines, 1913, p. 33.

Mohawkian or Richmond: Shamattawa River, Manitoba.

**Actinoceras rotulatum** (Billings).

*Orthoceras rotulatum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 334.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 732, pl. 437, figs. 1-5.

Niagaran: Head of Lake Temiscaming, Canada.

Observation.—Considered synonymous with *A. backi* (Stokes) by Foord (Cat. Foss. Ceph. British Mus., 1, 1888, p. 182).

**Actinoceras sedgwicki** (Billings).

*Orthoceras Sedgwicki* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 320; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 22, 58 (loc. ref.).

Richmond and Gamachian: West End, Gamachi Bay, etc., Anticosti.

**Actinoceras sphæroidale** (Stokes).

*Huronias sphæroidalis* Stokes, Trans. Geol. Soc. London, 2d ser., 1, pt. 2, 1824, p. 203, pl. 28, fig. 5.

*Orthoceras* (*Huronias*) *sphæroidale* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 742, pl. 232, fig. 3.

*Actinoceras sphæroidale* Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 186.

Niagaran: Drummond Island, Lake Huron.

**Actinoceras tenuifilum** (Hall).

*Ormoceras tenuifilum* Hall, Pal. New York, 1, 1847, p. 222, pl. 58, figs. 2a-c; p. 55, pl. 15, figs. 1a-c; pl. 16, figs. 1a-e; pl. 17, figs. 1a, b.—Saemann, Paleontographica, 3, 1852, p. 142.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 398, 405.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 72.—Chapman, Canadian Jour., n. s., 8, 1863, p. 20, fig. 129, p. 198, fig. 171; Expos. Min. Geol. Canada, 1864, p. 128, fig. 129, p. 170, fig. 171.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 158, fig.—Lesley, Geol. Surv. Pennsylvania Rep. P. 4, 1889, p. 504, fig.

*Hormoceras tenuifilum* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 602 (gen. ref.)

*Actinoceras tenuifilum* D'Orbigny, Prod. Pal., 1, 1849, p. 3 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 115, fig. 1351.



**Actinoceras tenuifilum**—Continued.

*Orthoceras* (*Ormoceras*) *tenuifilum* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 754, pl. 237.

*Orthoceras tenuifilum* James, Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 241.

Black River: Watertown, Lowville, etc., New York (Watertown); Kentucky; Tennessee.

**Actinoceras tenuifilum distans** (Hall).

*Ormoceras tenuifilum*? var. *distans* Hall, Pal. New York, 1, 1847, p. 58, pl. 17, fig. 2.

Black River (Watertown): Watertown, etc., New York.

**Actinoceras turgidonummulatum** (Foerste).

*Orthoceras* (*Actinoceras*) *turgido-nummulatus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 285, pl. 8, fig. 7; Geol. Surv. Ohio, Pal. 7, 1893, p. 538, pl. 33, fig. 7; pl. 35, figs. 1, 2.

Upper Medinan (Brassfield): Soldiers Home, near Dayton, Ohio

**Actinoceras vertebratum** (Hall).

*Ormoceras vertebratum* Hall, Pal. New York, 2, 1852, p. 94, pl. 29, fig. 1a-g.—Lesley, Geol. Surv. Pennsylvania Rep., P 4, 1889, p. 504, figs.

*Orthoceras* (*Ormoceras*) *vertebratum* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 755, pl. 232, 237.

*Actinoceras vertebratum* Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 185.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 528, fig. 1078.

Lower Clinton: Reynale's Basin, New York.

**Actinoceras whitei** (Stokes).

*Orthocerae* ——— Bigsby, Trans. Geol. Soc. London, 1, pt. 2, 1824, p. 204, pl. 30, fig. 2.

*Ormoceras whitei* Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 709.

*Actinoceras whitei* Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 184.

*Orthoceras Backi* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 731, pl. 437, figs. 17, 18.

Niagaran: Drummond Island, Lake Huron.

**Actinoceras youngi** (Foerste).

*Orthoceras* (*Actinoceras*) *youngi* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 284, pl. 8, fig. 3; Geol. Surv. Ohio, Pal., 7, 1893, p. 537, pl. 33, fig. 3; pl. 36, fig. 1.

Upper Medinan (Brassfield): Hanover, Indiana; Dayton, Ohio.

**ACTINOCRINITES TENNESSEÆ** Troost. See *Periechocrinus tennesseensis* and *P. dubius*.

**ACTINOCRINITES VERNEULI** Troost. See *Melocrinus roemeri*.

**ACTINOCRINUS CHRISTYI** Hall. See *Periechocrinus whitfieldi*.

**ACTINOCRINUS MEEKI** Lyon. See *Macrostylocrinus meeki*.

**ACTINOCRINUS OBPYRAMIDALIS** Winchell and Marcy. See *Melocrinus obpyramidalis*.

**ACTINOCRINUS? PLUMOSUS** Hall. See *Glyptocrinus plumosus*.

**ACTINOCRINUS POLYDACTYLUS** Bonny. See *Melocrinus pachydactylus*.

**ACTINOCRINUS (SACCOCRINUS) SEMIRADIATUS** Hall. See *Macrostylocrinus semiradiatus*.

*ACTINOCRINUS SPECIOSUS* Meek and Worthen. See *Periechocrinus speciosus*.

*ACTINOCRINUS SUBCRASSUS* Meek and Worthen. See *Iocrinus subcrassus*.

*ACTINOCRINUS TENUIRADIATUS* Hall. See *Palæocystites tenuiradiatus*.

*ACTINOCRINUS WALDRONENSIS* Shumard. See *Periechocrinus whitfieldi*.

*ACTINOCRINUS WHITFIELDI* Shumard. See *Periechocrinus whitfieldi*.

**ACTINODICTYON Parks.**

Genotype: *A. canadense* Parks.

*Actinodictyon* Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909, p. 30.

***Actinodictyon canadense* Parks.**

*Actinodictyon canadense* Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 32, pl. 20, figs. 1, 2.

Niagaran: Southampton Island, Hudson Bay, Canada.

***Actinodictyon keelei* Parks.**

*Actinodictyon keelei* Parks, Univ. Toronto Studies, Geol. Ser. No. 5, 1909, p. 35, pl. 19, figs. 5, 6.

Niagaran: Gravel River, Mackenzie District, Canada.

***Actinodictyon lowi* Parks.**

*Actinodictyon lowi* Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 33, pl. 20, figs. 3, 4.

Niagaran: Southampton Island, Hudson Bay, Canada.

***Actinodictyon neptuni* Parks.**

*Actinodictyon neptuni* Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 34, pl. 20, figs. 5, 6.

Niagaran: Southampton Island, Hudson Bay, Canada.

*ACTINODONTA* Phillips. See *Lyrodesma* Conrad.

*ACTINOMYA* Ulrich. See *Whiteavesia* Ulrich.

**ACTINOPTERIA Hall.**

Genotype: *A. decussata* Hall.

*Actinopteria* Hall, Pal. New York, 5, pt. 1, Lam. (adv. copy), 1883, p. 3; *ibid.*, 1884, p. xii; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 406b; 1st Rep. State Geol. New York, 1884, p. 13.—Miller, N. A. Geol. Pal., 1889, p. 459.—Nettelroth, Kentucky, Foss. Shells, Geol. Surv. Kentucky, 1889, p. 229.—Jackson, Mem. Boston Soc. Nat. Hist., 4, 1890, p. 386.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 59.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 245.—Clarke, Archiv. Mus. Nac. de Janeiro, 10, author's Eng. ed., 1900, p. 45.—Hind, Mon. British Carb. Lamell., 2, Pal. Soc., 1901, p. 22.

***Actinopteria bella* Williams.**

*Actinopteria bella* Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 342, pl. 30, figs. 17, 19.

Silurian (Pembroke): Leighton Cove, Washington County, Maine.

*Cotypes*.—Cat. No. 58964, U.S.N.M.

***Actinopteria communis* (Hall).**

*Avicula communis* Hall, Pal. New York, 3, 1859, p. 286, pl. 3, figs. 1-7; pl. 53, figs. 1, 4, 6.

*Actinopteria communis* Clarke, Mem. New York State Mus., 3, No. 3, 1900, p. 34, pl. 4, figs. 1, 2.—Weller, Pal. New Jersey, 3, 1903, p. 292, pl. 31, fig. 21.—Ohern, Maryland Geol. Surv., Low. Dev., 1913, p. 455, pl. 76, figs. 2-4.

Helderbergian: Helderberg Mountains, etc., New York; New Jersey; Cumberland, Maryland (Keyser, etc.).



**Actinopteria dispar** Williams.

Actinopteria dispar Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 343, pl. 30, figs. 20, 21.

Silurian (Pembroke): Leighton Cove, Washington County, Maine.

*Cotypes*.—Cat. No. 58966, U.S.N.M.

ACTINOPTERIA EMACERATA Whitfield and Hovey. See Pterinea emacerata.

**Actinopteria fornicata** Williams.

Actinopteria fornicata Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 343, pl. 30, figs. 14-16.

Silurian (Pembroke): Youngs Cove, Washington County, Maine.

*Holotype*.—Cat. No. 58965, U.S.N.M.

**Actinopteria reticulata** Weller.

Actinopteria reticulata Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 245, pl. 22, fig. 3.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 459, pl. 76, fig. 6.

Helderbergian: Near Tri States, New York (Decker Ferry); Keyser, West Virginia (Keyser).

ACTINOSTOMA Young and Young. See Fenestella Lonsdale.

**ACTINOSTROMA** Nicholson.

Genotype: *A. clathratum* Nicholson.

Actinostroma Nicholson, Mon. British Strom., Pal. Soc., 1886, p. 75.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 221.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 142.—Zittel-Eastman Textb. Pal., 1, 1900, p. 112; 2d ed., 1913, p. 122.

**Actinostroma franklinense** Parks.

Clathrodictyon franklinense Ami., Cruise of the "Neptune," 1906, p. 329 (nom. nud.). Actinostroma franklinense Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 27, pl. 19, figs. 3, 4.

Niagaran: Beechy Island, Lancaster Sound, Canada.

ACTINOSTROMA INFLECTUM Parks. See Actinostroma tenuifilatum inflectum.

**Actinostroma matutinum** Nicholson.

Actinostroma matutinum Nicholson, Ann. Mag. Nat. Hist., 6th ser., 7, 1891, p. 322, pl. 9, figs. 1, 2.—Whiteaves, Canadian Rec. Sci., 7, 1895, p. 134.—Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 14.

Silurian: L'Anse au Gascon, Baie de Chaleur, Quebec.

**Actinostroma tenuifilatum** Parks.

Actinostroma tenuifilatum Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 10, pl. 9, figs. 1-3; Ibid., No. 6, 1909, p. 25.

Niagaran: Ann Arbor, Michigan (drift); Drummonds Island, Lake Huron, Paganachuan River, and Southampton Island, Hudson Bay, Canada.

*Cotypes*.—Cat. Nos. 36828, 36829, U.S.N.M.

**Actinostroma tenuifilatum cylindricum** Parks.

Actinostroma tenuifilatum var. cylindricum Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909, p. 26.

Niagaran: Southampton Island, Hudson Bay, Canada.

**Actinostroma tenuifilatum inflectum** Parks.

Actinostroma inflectum Parks, Ottawa Nat., 22, 1898, p. 27; Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 11.

**Actinostroma tenuifilatum inflectum**—Continued.

*Actinostroma tenuifilatum* var. *inflectum*, Parks, Univ. Toronto Studies, Geol.

Ser. No. 6, 1909, p. 25, pl. 19, figs. 1 and 2.

Niagaran: Pagwachuan River and Little Current River, Canada.

**Actinostroma tenuissimum** Parks.

*Actinostroma tenuissimum* Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909,

p. 42, pl. 18, figs. 2, 3, 9, and 12.

Cayugan (Cobleskill): Schoharie County, New York.

**Actinostroma? trentonense** Ulrich and Everett.

*Actinostroma? trentonense* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p.

282, pl. 7, figs. 3a, b.

Black River (Platteville): Near Dixon, Illinois.

Sections of *holotype*.—Cat. No. 46545 U.S.N.M.

*ACTINOSTROMA TRENTONENSIS* Weller. See *Solenopora compacta*.

**Actinostroma vulcana** Parks.

*Actinostroma vulcana* Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 10,

pl. 1, figs. 1, 2, 5.

Niagaran (Guelph): Durham, Ontario.

**Actinostroma whiteavesi niagarensis** Parks.

*Actinostroma whiteavesi* var. *niagarensis* Parks, Univ. Toronto Studies, Geol.

Ser., No. 5, 1908, p. 11, pl. 12, figs. 4-5.

Niagaran (Lockport): Thorold, Ontario.

**ÆCHMINA** Jones and Holl.

Genotype: *A. cuspidata* Jones and Holl.

*Æchmina* Jones and Holl, Ann. Mag. Nat. Hist., 4th ser., 3, 1869, p. 217.—Zittel,

Handb. Pal., 2, 1885, p. 557.—Vogdes, Ann. New York Acad. Sci., 5, 1889,

p. 4, pl. 2, fig. 6.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 704.—Koken,

Die Leitfossilien, Leipzig, 1896, p. 40.—Grabau, Bull. Buffalo Soc. Nat. Sci.,

6, 1899, p. 308.—Ulrich, Zittel-Eastman Textb., Pal., 1, 1900, p. 644.—

Grabau, Bull. New York State Mus., 45, 9, 1901, p. 220; Bull. Buffalo Soc.

Nat. Sci., 7, 1901, p. 220.—Grabau and Shimer, N. A. Index Fossils, 2, 1910,

p. 345.—Bassler, Zittel-Eastman Textb., Pal., 2d ed., 1913, p. 738.

**Æchmina abnormis** Ulrich.

*Æchmina abnormis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 183,

pl. 12, figs. 7a, 7b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 346,

fig. 1660, h-j.

Clinton (Rochester): Lockport, etc. New York; Maryland, etc.

*Holotype*.—Cat. No. 41372, U.S.N.M.

*ÆCHMINA BYRNESI* Jones. See *Dicranella? byrnesi*.

**Æchmina spinosa** (Hall).

*Cytherina spinosa* Hall, Pal. New York, 2, 1852, p. 317, pl. 67, figs. 17-21.

*Beyrichia spinosa* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80

(gen. ref.).

*Æchmina spinosa* Jones and Holl, Ann. Mag. Nat. Hist., 4th ser., 3, 1869, p. 218

(gen. ref.).—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 11, pl. 13,

figs. 4-8.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 220, fig. 152;

Bull. New York State Mus., 45, No. 9, 1901, p. 220, fig. 152.—Grabau and

Shimer, N. A. Index Fossils, 2, 1910, p. 345, fig. 1659.

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario; Pennsylvania;

Maryland.



**Ægilops Hall.**Genotype: *Æ. subcarinata* Hall.*Ægilops* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 179 (doc. ed., p. 171).**Ægilops subcarinata Hall.***Ægilops subcarinata* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 179, pl. 4., figs. 1a, b (doc. ed., p. 171).

Trenton: Near Lowville, Lewis County, New York.

Observation.—Not recognized. Founded on cast of undetermined pelecypod.

**ÆONIA** Burmeister. See *Proetus* Steininger.**ÆSIOCYSTIS** Bather. See *Æsio cystites* Miller and Gurley.**ÆSIOCYSTITES** Miller and Gurley.Genotype: *A. priscus* Miller and Gurley.*Æsio cystites* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 13.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 732.*Æsio cystis* Bather, Treatise on Zoology (Lankester), pt. 3, 1900, p. 208.**Æsio cystites priscus** Miller and Gurley.*Æsio cystites priscus* Miller and Gurley, Bull. Illinois State Mus., 5, 1894, p. 14, pl. 2, figs. 10–12.—Miller, N. A. Geol. and Pal., 2d App., 1897, p. 732, text fig. 1281.

Trenton (Curdsville): Mercer County, Kentucky.

**ÆTHOCYSTITES** Miller.Genotype: *Æ. sculptus* Miller.*Æthocystites* Miller, N. A. Geol. Pal., 1st App., 1892, p. 673; 18th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1894, p. 263. (Adv. sheets, 1892, p. 9).—Bather, Treatise on Zoology (Lankester), pt. 3, 1900, p. 57.**Æthocystites sculptus** Miller.*Æthocystites sculptus* Miller, N. A. Geol. Pal., 1st App., 1892, p. 673, fig. 1207; 18th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1894, p. 264, pl. 2, fig. 2. (Advance sheets, 1892, p. 10, pl. 2, fig. 2.)

Niagaran (Laurel): St. Paul, Indiana.

**AGARICIA SWINDERNANA** Goldfuss. See *Thecia swindernana*.**AGELACRINITES** Vanuxem.Genotype: *A. hamiltonensis* Vanuxem.*Agelacrinites* Vanuxem, Geol. Surv. New York, 3d dist., 1842, p. 158.—Beyrich, Neues Jahrb. f. Min., etc., 1846, p. 192.—Forbes, Mem. Geol. Surv. Great Britain, 2, pt. 2, 1848, p. 519.—Hall, Pal. New York, 2, 1852, p. 236 footnote.—Billings, Canadian Jour., 2, 1854, p. 271.—Chapman, Canadian Jour., n. s., 5, 1860, p. 358, 361; Ann. Mag. Nat. Hist., 3d ser., 6, 1860, p. 159; Expos. Min. Geol. Canada, 1864, p. 110.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 53 (footnote).—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 290; 2d ed. 1881, p. 481.—Barrande and Waagen, Syst. Sil. du Centre Boheme, 7, pt. 1, 1887, p. 83, pl. 37.—Jaekel, Stammesges. Pemat., 1, 1899, p. 49.—Zittel, Grundzuge Pal., 1, 1910, p. 182.*Agelacrinus* Pictet, Traite de Pal. 2d ed., 4, 1857, p. 305.—Hall, Pal. New York, 3, 1859 (1861), p. 152.—Zittel, Handb. Pal., 1, 1879, p. 414.—Stürzt, Neues Jahrb. f. Min., 2, 1886, p. 144.—Miller, N. A. Geol. Pal., 1889, p. 221.—Bather, Treatise on Zoology (Lankester), pt. 3, 1900, p. 207, fig. 3.—Clarke, Bull. New York State Mus., 49, 1901 (1902), p. 184.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 112.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472.—Springer, Zittel-Eastman Textb. Pal. 1, 1913, p. 169.—Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 399.*Agelacrinus* (*Agelacrinites*) Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 353.*Agelacystis* Haeckel, Amphorideen u. Cystoideen, 1890, p. 114.

**Agelacrinites austini** (Foerste).

*Agelacrinus austini* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 444, pl. 6, fig. 1.

Richmond (Whitewater): Four and one-half miles northwest Wilmington, Ohio.

AGELACRINITES (EDRIOASTER) BIGSBYI Chapman. See *Edrioaster bigsbyi*.

AGELACRINITES BILLINGSI Chapman. See *Hemicystites billingsi*.

**Agelacrinites cincinnatiensis** (Roemer).

*Agelacrinus Cincinnatiensis* Roemer, Verhdl. Nat. Hist. Ver. preuss. Rheinland, 8, 1851, p. 372, pl. 8, fig. 3.—Bronn, Leth. geog., 3d ed., 2, 1855, p. 277, pl. 4, fig. 6.—Hall, Desc. n. sp. Crin., etc., 1886, p. 6.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 3, fig. 16.—Zittel, Handb. Pal., 1, 1879, p. 414, fig. 291.—Miller, N. A., Geol. Pal., 1889, p. 222, fig. 241.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 476, pl. 1, fig. 6.

*Agelacrinus* (*Lepidodiscus*) *Cincinnatiensis* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 214, pl. 6, fig. 7; Desc. n. sp. fossils, Cincinnati, Ohio, 1871, photographic pl. 2, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472, fig. 1784b.

*Lepidodiscus cincinnatiensis* Sharman and Newton, Quart. Jour. Geol. Soc. London, 48, 1892, p. 151.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 113, fig. 16.—Bather, Treatise on Zool., pt. 3, Echinoderma, 1900, p. 207, fig. 4.

*Agelacrinites* (*Lepidodiscus*) *Cincinnatiensis* Meek, Geol. Surv. Ohio, Pal. 1, pt. 2, 1873, p. 55, pl. 3, fig. 6a, b.

*Agelacrinites cincinnatiensis* Jaekel, Stamm. Pemat., 1, Thecoidea, u. Cystoidea, Berlin, 1899, p. 50, pl. 2, fig. 1.—Clarke, Bull. New York State Mus., 49, 1901, p. 185.

Maysville (Fairmount-Corryville): Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee.

**Agelacrinites dicksoni** Billings.

*Agelacrinites dicksoni* Billings, Rep. Progress 1853–56, Geol. Surv. Canada, 1857, p. 294; Canadian Org. Rem., dec. 3, Geol. Surv. Canada, 1858, p. 84, pl. 8, fig. 3, 3a, 4, 4a.—Chapman, Expos. Min. Geol. Canada, 1864, p. 110.—Grant, Trans. Ottawa Field Nat. Club, 1, No. 2, 1881, fig. 9.—Jaekel, Stamm. Pemat. 1, Thecoidea u. Cystoidea, 1899, p. 50, pl. 2, fig. 2.—Clarke, Bull. New York State Mus. 49, 1901, p. 191, fig. 3.

*Agelacrinus Dicksoni* Haeckel, Amphorideen u. Cystoideen, 1896, pl. 3, fig. 29.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 44 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**Agelacrinites faberi** (Miller).

*Agelacrinus faberi* Miller, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 156, pl. 8, figs. 24, 25.—Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 441, pl. 1, fig. 3, pl. 3, fig. 4.

*Lepidodiscus faberi* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 728, pl. 4, fig. 11.

Richmond (Whitewater): Between Osgood and Versailles, Indiana.

**Agelacrinites holbrooki** (James).

*Agelacrinus Holbrooki* James, Paleontologist, No. 1, 1878, p. 2; Jour. Cincinnati Soc. Nat. Hist., 10, 1897, p. 25, figs. A, B.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 446, pl. 1, fig. 1, pl. 4, fig. 1.



**Agelacrinites holbrooki**—Continued.

Agelacrinites Holbrooki Jaekel, Stammes. *Pelmat.*, 1, Thecoidea u. Cystoidea, Berlin, 1889, p. 50.—Clarke, *Bull. New York State Mus.*, 49, 1901, p. 189, fig. 2. Maysville(?Corryville): Near Lebanon (Morrow), Ohio.  
Plesiotype.—Cat. No. 40744, U.S.N.M.

**Agelacrinites pileus** (Hall).

Agelacrinites (Lepidodiscus) pileus Hall., 24th Rep. New York State Cab. Nat. Hist., 1872, p. 214, pl. 6, figs. 8–10 (Adv. publication, 1866).  
Lepidodiscus pileus Sladen, *Quart. Jour. Geol. Soc. London*, 1879, p. 750.  
Agelacrinites pileus Miller and Faber, *Jour. Cincinnati Soc. Nat. Hist.*, 15, 1892, p. 85, pl. 1, fig. 10.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 482, pl. 2, figs. 1–4.  
Agelacrinites pileus Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 56, pl. 3, fig. 5.—Jaekel, Stammes, *Pelmatozoen*, 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 50, fig. 10, pl. 1, fig. 6.  
Maysville (Fairmount-Corryville): Cincinnati, Ohio, and vicinity.

**AGELACRINITES SEPTEMBRACHIATUS** Jaekel. See *Streptaster septembrachiatus*.

**Agelacrinites vetustus** (Foerste).

Agelacrinites vetustus Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 439. Trenton (Cynthiana): Clays Ferry, Kentucky.

**AGELACRINITES VORTICELLATA** Meek. See *Streptaster vorticellatus*.

**Agelacrinites warrenensis** (James).

Agelacrinites warrenensis James, *Paleontologist*, No. 7, 1883, p. 58, pl. 2, figs. 3, 3a.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 448, pl. 1, fig. 4.  
Maysville (Fairmount): Morrow, Ohio.  
Observation.—Poorly defined and figured. Probably young specimens of *A. cincinnatiensis*.

**AGELACRINUS** of authors. See *Agelacrinites Vanuxem*.

**AGELACRINUS BIGSBYI** Schmidt. See *Edrioaster bigsbyi*.

**AGELACRINUS BILLINGSI** Chapman. See *Hemicystites billingsi*.

**AGELACRINUS CINCINNATIENSIS** of authors. See *Agelacrinites cincinnatiensis*.

**AGELACRINUS DICKSONI** Hæckel. See *Agelacrinites dicksoni*.

**AGELACRINUS FABERI** Miller. See *Agelacrinites faberi*.

**AGELACRINUS HOLBROOKI** James. See *Agelacrinites holbrooki*.

**AGELACRINUS PARASITICA** Hall. See *Hemicystites parasiticus*.

**AGELACRINUS PILEUS** of authors. See *Agelacrinites pileus*.

**AGELACRINUS SEPTEMBRACHIATUS** Miller and Dyer. See *Streptaster septembrachiatus*.

**AGELACRINUS (HEMICYSTITES) STELLATUS** Hall. See *Hemicystites stellatus*.

**AGELACRINUS VORTICELLATA** Hall. See *Streptaster vorticellatus*.

**AGELACRINUS WARRENENSIS** James. See *Agelacrinites warrenensis*.

**AGELACYSTIS** Hæckel. See *Agelacrinites Vanuxem*.

**AGNOSTUS** Brongniart. Genotype: *Entomolitus paradoxus pisiformis* Linnæus.

*Agnostus* Brongniart, Hist. Crust. Foss., 1822, p. 38.—DeKay, Ann. Lyceum Nat. Hist. New York, 1, 1824, p. 176, footnote.—Green, Mon. Tril. N. A., 1832, p. 17.—Murchison, Sil. Syst., 1839, p. 664.—Edwards, Hist. Nat. d. Crustacées, 3, 1840, p. 347.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, p. 541.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 526.—Salter, Mem. Geol. Surv. United Kingdom, dec. 11, 1864, pl. 1.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 296 (ibid., 2d ed., 1881, p. 488).—Brögger, Nyt Mag. for Naturvid., 24, 1877, p. 61.—Angelin, Pal. Scandinavica, 3d ed., Holmiæ, 1878, p. 5.—Tullberg, Sveriges, Geol. Unders., Ser. C, No. 42, 1880, p. 11.—Zittel, Handb. Pal., 2, 1885, p. 592.—Matthew, Trans. Royal Soc. Canada, 3, sec. 4, 1886, p. 67.—Miller, N. A. Geol. Pal., 1889, p. 526.—Vogdes, Amer. Geol., 9, 1892, pp. 377–383; Cal. Acad. Sci., Occ. Papers, 4, 1893, p. 262.—Beecher, Amer. Jour. Sci., 3d ser., 46, 1893, p. 143; Amer. Geol., 16, 1895, p. 175.—Matthew, Trans. New York Acad. Sci., 15, 1896, p. 207.—Koken, Die Leitfossilien, Leipzig, 1896, p. 14, fig. 6.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 104, 183, pl. 3, fig. 9.—Matthew, Trans. Royal Soc. Canada, 2d ser. 3, sec. 4, 1897, p. 170.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, pp. 10, 37, pl. 1, fig. 7.—Matthew, Amer. Geol., 27, 1901, p. 56.—Gronwall, Danmarks Geol. Unders., 2, Række, No. 13, 1902, p. 46.—Jaekel, Zeit. d. Deutsch. Geol. Gesell., 61, 1909, p. 380.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 710.

***Agnostus acadicus declivus* Matthew.**

*Agnostus Acadicus* var. *declivis* Matthew, Trans. Royal Soc. Canada, 3, sec. 4, 1886, p. 70, pl. 7, figs. 6a, b.—Vogdes, Amer. Geol., 9, 1892, p. 387, pl. 9, fig. 8.—Matthew, Trans. New York Acad. Sci., 15, 1896, p. 219, pl. 15, figs. 11a–d.  
*Agnostus* cf. *declivis* Matthew, Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 223.  
 Canadian (Bretonian—Div. C. 3b): McNeil Brook, Cape Breton, Nova Scotia.

***Agnostus americanus* Billings.**

*Agnostus Americanus* Billings, Canadian Nat. Geol., 5, 1860, p. 302, fig. 1 a, b; Geol. Canada, Geol. Surv. Canada, 1863, p. 233, figs. 250 a, b; Pal. Foss. 1, Geol. Surv. Canada, 1865, p. 395, fig. 372 a, b.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 298.  
 Ozarkian? (Levis—erratic): Point Levis, Quebec.

***Agnostus bisectus* Matthew.**

*Agnostus bisectus* Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 50, pl. 13, figs. 2 a, b.  
 Canadian (Bretonian—Div. C. 3b): Navy Island, St. John, New Brunswick.

***Agnostus bolivianus* Hoek.**

*Agnostus bolivianus* Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 212, pl. 7, fig. 6.  
 Lowest Ordovician: Salitre, Bolivia-Argentina boundary.

***Agnostus canadensis* Billings.**

*Agnostus Canadensis* Billings, Canadian Nat. Geol., 5, 1860, p. 304, fig. 3 a, b; Geol. Canada, Geol. Surv. Canada, 1863, p. 233, fig. 252 a, b; Pal. Fos., 1, Geol. Surv. Canada, 1865, p. 397, fig. 374 a, b.—Brögger, Geol. Foren. Stockholm Forhandl., 8, 1886, p. 207.—Vogdes, Amer. Geol., 9, 1892, p. 390, pl. 9, fig. 9.  
 Ozarkian? (Levis—erratic): Point Levis, Quebec.



**Agnostus communis** Hall and Whitfield.

*Agnostus communis* Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 228, pl. 1, figs. 28, 29.—Walcott, Mono. U. S. Geol. Surv., 8, 1884, p. 27.—Brögger, Geol. Foren. Stockholm Forhandl., 8, 1886, p. 207.—Vogdes, Amer. Geol., 9, 1892, p. 390, pl. 9, fig. 15.

Cambrian and ?Ordovician (Pogonip): White Pine and Eureka Districts, Nevada.

**AGNOSTUS CYCLOPYGE** Tullberg. See *Lejopyge cyclopyge*.

**Agnostus fabius** Billings.

*Agnostus Fabius* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 298, text fig. 289.—Vogdes, Amer. Geol., 9, 1892, p. 396, pl. 9, fig. 10.

Chazyan (Quebec—N, P): Table Head, Pistolet Bay and four miles northeast Port. land Creek, Newfoundland.

**AGNOSTUS GALBA** Billings. See *Arthrorrachis galba*.

**AGNOSTUS LATUS** Vanuxem. See *Beyrichia lata*.

**Agnostus orion** Billings.

*Agnostus Orion* Billings, Canadian Nat. Geol., 5, 1860, p. 304, fig. 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 233, fig. 251.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1863, p. 105.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 397, fig. 373.—Vogdes, Amer. Geol., 9, 1893, p. 391, pl. 9, fig. 12.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

**Agnostus pisiformis** (Linnæus).

*Entomolithus paradoxus pisiformis* Linnæus, Inter Scan., 1757, p. 122.

*Agnostus pisiformis* Brongniart, Crust. foss., 1822, p. 38.—Roemer, Leth. geog., 1. Leth. Pal., Atlas, 1876, pl. 1, fig. 2a.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 42, 1880, p. 25, pl. 2, fig. 14.—Salter, Mem. Geol. Surv. Great Britain, 2d ed., 1881, p. 489.—Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 55 (cites bibliography).—Wallerius, Unders. Zonen med *Agnostus lævigatus* i Vestergotland, Lund, 1895, p. 43.—Koken, Die Leitfossilien, Leipzig, 1896, p. 11, fig. 6; p. 347, fig. 242, 1.

*Agnostus pisiformis* var. *Matthew*, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 59, pl. 13, fig. 1a, b; *ibid.*, 1898, p. 138, pl. 2, figs. 1a-c.

Lower Ordovician: Europe.

Canadian (Bretonian—Div. C3a): Long Island, Kennebecasis River, New Brunswick.

**Agnostus pisiformis affinis** Matthew.

*Agnostus pisiformis* mut. *affinis* Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 137, pl. 2, fig. 3.

Canadian (Bretonian—Div. C 3a): Kennebecasis Valley, New Brunswick.

**Agnostus pisiformis rugulosus** Matthew.

*Agnostus pisiformis* mut. *rugulosus* Matthew, Trans. Royal Soc. Canada, 2d ser. 4, sec. 4, 1898, p. 137, pl. 2, fig. 2.

Canadian (Bretonian—Div. C 3a): Kennebecasis Valley, New Brunswick.

**Agnostus pisiformis validus** Matthew.

*Agnostus pisiformis* mut. *valida* Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 137.

Canadian (Bretonian—Div. C 3a): Kennebecasis Valley, New Brunswick.

**Agnostus sidenbladhi** Linnarsson.

*Agnostus Sidenbladhi* Linnarsson, Vesterg. Cambr., etc., 1869, p. 82, pl. 2, figs. 60, 61 (K. Sv. Vet. Akad. Handl.); Oivers. K. Vet.-Akad. Forhandl., 26, 1869, p. 195.—Brögger, Die Sil. Etage 2-3, Kristiania, 1882, p. 56 (cites bibliography).

Canadian: Europe; Point Levis, Quebec (Levis-Diplograptus dentatus zone) [Raymond].

**Agnostus trisectus** Salter.

*Agnostus trisectus* Salter, Mem. Geol. Surv., dec. 11, 1864, p. 10, pl. 1, fig. 11.—Belt, Geol. Mag., 5, 1868, p. 11.—Salter, Cat. Camb. Sil. Foss., 1873, p. 10.—Linnarsson, Geol. For. Stockholm Forhandl., 5, 1880, p. 157, p. 6, fig. 16.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 42, 1880, p. 24, pl. 1, fig. 13.—Linnarsson, ibid., No. 43, 1880, p. 27, pl. 2, fig. 16.—Matthew, Trans. Royal Soc., Canada, 11, sec. 4, 1894, p. 110.—Groom, Quart. Jour. Geol. Soc., London, 58, 1902, p. 119.

Lower Ordovician: Europe.

Canadian (Bretonian—Div. C 3b): McNeil Brook, Cape Breton, Nova Scotia.

**Agnostus trisectus germanus** Matthew.

*Agnostus trisectus* mut. *germanus* Matthew, Bull. Nat. Hist. Soc. New Brunswick, No. 19, 1901, p. 279; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 221.

Canadian (Bretonian—Div. C 3b): East Bay, east of Bras d'Or Lake, Cape Breton, Nova Scotia.

**Agnostus trisectus ponepunctus** Matthew.

*Agnostus trisectus* mut. *ponepunctus* Matthew, Bull. Nat. Hist. Soc. New Brunswick, No. 19, 1901, p. 278, pl. 5, fig. 8a-c; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 220, pl. 17, figs. 8a-c.

Canadian (Bretonian—Div. C 3b): McAdam shore, East Bay, Bras d'Or Lake, Cape Breton, Nova Scotia.

**AGNOSTUS TUBERCULATUS** Quenstedt. See *Beyrichia tuberculata*.

**Agnostus tumidosus** Hall and Whitfield.

*Agnostus tumidosus* Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 231, pl. 1, fig. 32.—Brogger, Geol. Foren Stockholm Forhandl., 8, 1886, p. 204.—Vogdes, Amer. Geol., 9, 1892, p. 393, pl. 10, fig. 8.—Walcott, Mono. U. S. Geol. Surv., 32, pt. 2, 1899, p. 455, pl. 63, figs. 5, 5a.

Cambrian and ?Ordovician (Pogonip): Eureka District, Nevada.

**AGRAULOS CYLINDRICUS** Miller. See *Arionellus cylindricus*.

**AGRAULOS OWENI** Meek and Hayden. See *Ptychoparia oweni*.

**AGRAULOS (ARIONELLUS) PUSTULATUS** Vogdes. See *Glaphurus pustulatus*.

**AGRAULOS SARATOGENSIS** Walcott. See *Plethopeltis saratogensis*.

**ALECTO** Lamouroux. See *Stomatopora Bronn*.

**ALECTO AULOPOROIDES** Nicholson. See *Proboscina auloporoides*.

**ALECTO CONFUSA** Nicholson. See *Proboscina confusa*.

**ALECTO FRONDOSA** Nicholson. See *Proboscina frondosa*.

**ALECTA INFLATA** Hall. See *Corynotrypa inflata*.



*ALECTO NEXILIS* James. See *Batostoma implicatum*.

**ALEPIDASTER** Meek. Genotype: *Protaster?* *granuliferus* Meek.  
*Alepidaster* Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 275; Geol. Surv. Ohio, Pal., 1, 1873, p. 68.—Schuchert, Bull. U. S. Nat. Mus., 88, 1915, p. 228.  
*Protasterina* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 95—James, *ibid.*, 18, 1895, p. 139. (Genotype: *P. fimbriata* Ulrich).

***Alepidaster fimbriatus*** (Ulrich).

*Protasterina* (*Protaster*) *fimbriata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 95, pl. 4, figs. 9, 9a, 9b, 9c.  
*Protasterina fimbriata* James, *ibid.*, 18, 1895, p. 139.  
 Eden (Economy): Covington, Kentucky.

***Alepidaster flexuosus*** (Miller and Dyer).

*Protaster flexuosus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 31, pl. 2, figs. 1, 1a.—Miller, N. A. Geol. Pal., 1889, p. 276, fig. 409.—Parks, Trans. Canadian Inst., 8, 1908, p. 368.  
*Protasterina flexuosa* James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 140.  
*Alepidaster flexuosus* Schuchert, in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 231, pl. 36, fig. 4.  
 Maysville: Cincinnati, Ohio.

***Alepidaster granuliferus*** (Meek).

*Protaster?* *granuliferus* Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 274; Geol. Surv. Ohio, Pal., 1, 1873, p. 68, pl. 3 bis., figs. 8a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 775, figs.—James, Jour. Cincinnati Soc. Nat. Hist., 23, 1896, p. 138.—Parks, Trans. Canadian Inst., 8, 1908, p. 368.  
*Tæniaster granuliferus* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 733, pl. 3, fig. 7.  
*Alepidaster granuliferus* Schuchert, in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 230, fig. 26.  
 Richmond: Moore's Hill, Indiana.

***Alepidaster miamiensis*** (Miller).

*Protaster miamiensis* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1872, p. 116, pl. 5, figs. 6, 6a, 6b.—James, *ibid.*, 18, 1895, p. 138.—Parks, Trans. Canadian Inst., 8, 1908, p. 368.  
*Alepidaster miamiensis* Schuchert, in Frech, Foss. Cat., 1, pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 233.  
 Richmond (Waynesville or Liberty): Near Waynesville, Ohio.  
*Cotypes*.—Cat. No. 40886, U.S.N.M.

**ALLOCRINUS** Wachsmuth and Springer.

Genotype: *A. typus* Wachsmuth and Springer.

*Allocrinus* Wachsmuth and Springer in Miller, N. A. Geol. Pal., 1889, p. 222; Geol. Surv. Illinois, 8, 1890, p. 206; Proc. Acad. Nat. Sci. Philadelphia, 1890, p. 376; Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 306.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 162.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 148.—Zittel, Grundzuge Pal., 1, 1910, p. 162.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 191.

***Allocrinus benedicti*** Miller.

*Allocrinus benedicti* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 647, pl. 7, fig. 1 (Adv. sheets, 1891, p. 37); N. A. Geol. Pal., 1st App., 1892, p. 674, fig. 1210.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 308, pl. 24, fig. 8a, b.  
 Niagara (Laurel): St. Paul, Indiana.

**Allocrinus typus** Wachsmuth and Springer.

*Allocrinus typus* Wachsmuth and Springer, Geol. Surv. Illinois, 8, 1890, p. 207, pl. 14, figs. 7, 7a, b; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 307, pl. 24, fig. 7a, b.

Niagaran (Brownsport): Wayne and Decatur Counties, Tennessee.

**ALLOCYSTITES** Miller.

Genotype: *A. hammelli* Miller.

*Allocystites* Miller, N. A. Geol. Pal., 1889, p. 222.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 398.—Zittel, Grundzuge Pal., 1, 1910, p. 72.

**Allocystites hammelli** Miller.

*Allocystites hammelli* Miller, N. A. Geol. Pal., 1889, p. 222, fig. 242.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 398.

Clinton (Osgood): Jefferson County, Indiana.

**ALLODESMA** Ulrich.

Genotype: *Modiolopsis subelliptica* Ulrich.

*Modiolopsis* (part) Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 226.

*Allodesma* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 617.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 393; *ibid.*, 2d ed., 1913, p. 470.

**Allodesma subellipticum** (Ulrich).

*Modiolopsis subelliptica* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv., Minnesota, 1892, p. 226, fig. 12.

*Allodesma subellipticum* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 617, pl. 42, figs. 9-14.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 103, pl. 6, fig. 11.

Trenton: Near Cannon Falls, Minnesota (Prosser); Canajoharie, New York (Canajoharie).

*Holotype* and *plesiotype*.—Cat. No. 46078, U.S.N.M.

**ALLONEMA** Ulrich and Bassler.

Genotype: *A. botelloides* Ulrich and Bassler.

*Allonema* Ulrich and Bassler, Smith. Misc. Coll. (Quart. Issue), 45, 1904, p. 276-279.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 118.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 318.

**Allonema waldronense** Ulrich and Bassler.

*Allonema waldronense* Ulrich and Bassler, Smith. Misc. Coll. (Quart. Issue), 45, 1904, p. 283, pl. 67, fig. 5.—Bassler, Bull. U. S. Geol. Survey, 292, 1906, p. 13, pl. 4, fig. 9.

Niagaran: Waldron, Indiana (Waldron); Middleport, New York (Rochester).

*Holotype*.—Cat. No. 43128, U.S.N.M.

**ALLONYCHIA** Ulrich.

Genotype: *Ambonychia* (*Megambonia*) *jamesi* Meek.

*Megambonia* Meek (not Hall, 1859), Proc. Acad. Nat. Sci., Philadelphia, 1872, p. 321.

*Allonychia* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 640.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 978.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 432.

**Allonychia flanaganensis** Foerste.

*Allonychia flanaganensis* Foerste Bull. Sci. Lab. Denison Univ. 17, 1912, p. 30; Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 134, pl. 2, fig. 1.

Trenton (Cynthiana): Flanagan, etc., Kentucky.



**Allonychia jamesi** (Meek).

*Megambonia jamesi* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 321; Geol. Surv. Ohio, Pal. 1, 1873, p. 136, pl. 12, figs. 9a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1873, p. 13; *ibid.* 1874, p. 225.

*Ambonychia jamesi* Miller, N. A. Geol. Pal., 1889, p. 460 (gen. ref.)

*Allonychia jamesi* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 641, pl. 48, fig. 7.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 986, pl. 43, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 432.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Plesiotype*.—Cat. No. 46079, U.S.N.M.

**Allonychia ovata** Ulrich.

*Allonychia ovata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 641, pl. 48, figs. 4-6.

Maysville (Fairmount): Covington, Kentucky.

*Holotype*.—Cat. No. 46080 U.S.N.M.

**Allonychia subrotunda** Ulrich.

*Allonychia subrotunda* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 642, pl. 48, figs. 8, 9.

Maysville (Corryville): Cincinnati, Ohio.

*Holotype*.—Cat. No. 46081, U.S.N.M.

**ALVEOLITES** Lamarck.

Genotype: *A. suborbicularis* Lamarck.

*Alveolites* Lamarck, Syst. des Anim. sans. Vert., 1801, p. 375.—Steininger, Mem.

Soc. Geol. France, 1, 1834, p. 333.—Koninck, Desc. Animaux Fossiles,

Leige, 1842, p. 11.—Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, Zoophytes,

1846, p. 537.—Edwards and Haime, Compt. Rend. l'Acad. Sci., 29, 1849, p.

260.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 29.—Edwards

and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist., 5),

1851, p. 153; McCoy, British Pal. Rocks Foss., 1854, p. 68.—Pictet, Traite de

Pal., 2d ed., 4, 1857, p. 442.—Billings, Canadian Jour., n. s., 4, 1858, p. 114.—

Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 263.—Rominger, Amer.

Jour. Sci. and Arts, 2d ser., 34, 1862, p. 390.—Duncan, Rep. 41st Meeting

British Assoc. Adv. Sci., 1872, p. 132.—Salter, Cat. Camb. Sil. Foss., 1873, p.

106.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 53; Geol. Mag., dec.

2, 1, 1874, p. 14.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 40.—

Nicholson, Trans. Royal Soc. Edinburgh, 27, 1876, p. 247.—Nicholson and

Etheridge, Jour. Linnean Soc. London, Zool., 13, 1877, p. 353, 354.—Nichol-

son, Tab. Corals, 1879, p. 117.—Zittel, Handb. Pal., 1, 1880, p. 618.—Roemer,

Leth. geog., pt. 1, Leth. Pal., 1883, p. 441.—Hall and Simpson, Pal. New York

6, 1887, p. xiii.—Nicholson, Geol. Mag., dec. 3, 5, 1888, p. 107.—Miller,

N. A. Geol. Pal., 1889, p. 170.—Lambe, Cont. Can. Pal., Geol. Surv. Canada,

4, pt. 1, 1899, p. 20.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893,

pp. 147, 148.—Sardeson, Neues Jahrb. Min., Geol., Pal., Beilage-Band, 10,

1896, p. 315.—Zittel-Eastman Textb. Pal., 1, 1900, p. 100.—Pocta, Syst. Sil.

du Centre Boheme, 8, pt. 2, 1902, p. 266.—Grabau and Shimer, N. A. Index

Fossils, 1, 1906, p. 91.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 114.

**Alveolites? arcticus** Woodward.

*Alveolites? arctica* Woodward, Geol. Mag., dec. 2, 5, 1878, p. 289, pl. 10, fig. 7.

Niaganan: Beechy Island, Arctic America.

**ALVEOLITES EXPANSA** James. See *Ceramopora? expansa*.**ALVEOLITES EXSUL** Hall. See *Lioclema? exsul*.**Alveolites fibrosus** Davis.

*Alveolites fibrosus* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, fig. 8.

Niaganan (Louisville): Near Louisville, Kentucky.

**ALVEOLITES GRANULOSUS** James. See *Stromatocerium huronensis*.

**ALVEOLITES HEMISPHERICUS** D'Orbigny.

*Alveolites hemispherica* D'Orbigny, Prodr. Pal., 1, 1849, p. 49.—Boule and Thevenin, Ann. Pal., 1, 1906, p. 8, pl. 4, figs. 1-4.

Silurian(?): Falls of the Ohio.

Observation.—The figures given by Boule and Thevenin refer to a Devonian species.

**Alveolites inornatus** Foerste.

*Alveolites inornatus* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 103, pl. 3, fig. 56.

Niagaran (Brownsport): East of Linden, Tennessee.

**ALVEOLITES IRREGULARIS** Whitfield. See *Ceramoporella? irregularis*.

**Alveolites labechei** Edwards and Haime.

*Alveolites labechei* Edwards and Haime, Polyp. Foss. d. Terr. Pal., 1851, p. 257.—

Milne-Edwards and Haime, Brit. Foss. Corals, 1855, p. 262, pl. 61, figs. 6a-b.—

Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 33 (loc. ref.).—

Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 21.—

Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 285.

Silurian: Great Britain and Russia; Anticosti (Jupiter River) and Manitoulin Islands, Canada (Niagaran).

**Alveolites louisvillensis** Davis.

*Alveolites louisvillensis* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, figs. 5, 6.

Niagaran: Louisville, Kentucky (Louisville); West Tennessee (Brownsport).

*Cotype*.—Cat. No. 52754 U.S.N.M.

**Alveolites? niagarensis** Nicholson and Hinde.

*Alveolites Niagarensis* Nicholson and Hinde (not Rominger), Canadian Journal, n. s., 14, 1874, p. 152, fig. 3.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 56, fig. 27.

Niagaran (Lockport): Rockford, Ontario.

Observation.—Probably a species of *Cladopora*.

**ALVEOLITES NIAGARENSIS** Rominger. See *Alveolites undosus*.

**ALVEOLITES PEGRAMENSIS** Foerste. See *Pachypora* (*Platyaxum*) *pegramensis*.

**Alveolites repens** (Fought).

*Millepora repens* Fought, Amœn Acad., 1, 1749, p. 99.

*Alveolites repens* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851

(Arch. du Mus. d'Hist. Nat., 5), p. 258.—Mon. British Foss. Corals, Pal. Soc.,

1854, p. 263, pl. 62, figs. 1, 1a.—Roemer, Sil. Fauna West Tennessee, 1860,

p. 22, pl. 2, fig. 13, 13a.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 268.

Silurian: Gotland and England;? West Tennessee.

Observation.—Roemer's reference is to some *Cladopora* probably distinct from *Alveolites repens* (Fought).

**ALVEOLITES REPENS** Billings. See *Cœnites juniperina*.

**Alveolites? seriatorpora** Edwards and Haime.

*Alveolites? seriatorpora* Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch. Mus. Hist. Nat., 5), p. 260.

Silurian: Dudley, England; Bear Grass Creek near Louisville, Kentucky.

Observation.—Not recognized as an American species.



ALVEOLITES STROMATOPOROIDES Rominger. See Dictyostroma undulatum.

**Alveolites thoroldensis Parks.**

Alveolites thoroldensis Parks, Univ. Toronto Studies, Geol. Ser. No. 5, 1908, p. 59, pl. 15, figs. 5 and 6.

Niagaran: Louisville, Kentucky (Louisville); Thorold, Ontario (Lockport).

**Alveolites undosus Miller.**

Alveolites niagarensis Rominger (not Nicholson and Hinde), Geol. Surv. Michigan, 3, pt. 2, 1876, p. 40, 41, fig., pl. 16, figs. 1, 2.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, fig. 7.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 336.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 22.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 91.

Alveolites undosus Miller, N. A. Pal. Foss. (2d ed.), 1883, p. 262.

Niagaran: Drummond Island, Lake Huron; Point Detour, Michigan; Lake Temiscaming, Saskatchewan River, etc., Quebec; Falls of the Ohio (Louisville); Dayton, Ohio; West Tennessee (Brownsport).

AMBONYCHIA of authors. See Byssonychia and Clionychia Ulrich.

**AMBONYCHIA Hall.**

Genotype: *A. bellistriata* Hall.

Ambonychia (part) Hall, Pal. New York, 1, 1847, p. 163.—McCoy, British Pal. Rocks and Foss., 1854, p. 264.—Woodward, Man. Mollusca, 2, 1854, p. 261.—Hall, Pal. New York, 3, 1859, pp. 14, 272, 523; 12th Rep. New York State Cab. Nat. Hist., 1859, pp. 8, 110.—Zittel, Handb. Pal., 2, 1881, p. 35.—Miller, N. A. Geol. Pal., 1889, p. 460.—Koken, Die Leitfossilien, Leipzig, 1896, p. 185.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 489.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 429.

AMBONYCHIA ACUTIROSTRA Hall. See Mytilarca acutirostra.

**Ambonychia affinis Ulrich.**

Ambonychia affinis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 492, pl. 35, figs. 5-7. Trenton (Prosser): Near Spring Valley, Minnesota; Carroll County, Illinois.

Cotype.—Cat. No. 46083, U.S.N.M.

AMBONYCHIA (MEGAPTERA) ALATA Meek. See Anomalodonta alata.

**Ambonychia amygdalina Hall.**

Ambonychia amygdalina Hall, Pal. New York, 1, 1847, p. 165, pl. 36, figs. 6a-c.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 493, pl. 35, figs. 8, 9.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 430, fig. 561c-d.

Palæarca? amygdalina Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 65 (gen. ref.).

Cypricardites amygdalina Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 22, fig.

Posidonomya amygdalina Emmons, Amer. Geology, 1, pt. 2, 1855, p. 177, pl. 13, figs. 20, 21.

Cleionychia amygdalina Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Trenton: Adams, Jefferson County, New York; Goodhue County, Minnesota (Prosser).

Plesiotype.—Cat. No. 46085, U.S.N.M.

AMBONYCHIA APHÆA Hall. See Streptomytilus aphæa.

AMBONYCHIA ATTENUATA of authors. See Clionychia lamellosa.

**Ambonychia bellistriata** Hall.

*Ambonychia bellistriata* Hall, Pal. New York, 1, 1847, p. 163, pl. 36, figs. 4a-d.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 605.—Zittel, Handb. Pal., 2, Munich, 1881, p. 35, fig. 42a.—Lesley, Geol. Surv. Pennsylvania, Rep., P. 4, 1889, p. 22, fig.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 492, pl. 35, figs. 1 and 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 430, fig. 561a, b.

*Posidonomya bellistriata* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 176, pl. 13, figs. 5, 6.

Trenton: Middleville and Trenton Falls, New York; near Wykoff, Minnesota (Prosser).

*Plesiotype*.—Cat. No. 46084, U.S.N.M.

**AMBONYCHIA BELLISTRIATA** Miller. See *Byssonychia vera*.

**AMBONYCHIA CARINATA** Hall. See *Byssonychia carinata*.

**AMBONYCHIA (MEGAPTERA) CASEI** Meek and Worthen. See *Opisthoptera casei*.

**AMBONYCHIA (MEGAPTERA) CASEI?** Meek. See *Opisthoptera fissicosta*.

**AMBONYCHIA CINCINNATIENSIS** Miller and Faber. See *Byssonychia vera*.

**AMBONYCHIA COSTATA** James. See *Anomalodonta costata*.

**Ambonychia? curvata** Raymond.

*Ambonychia? curvata* Raymond, Amer. Jour. Sci., 20, 1905, p. 373.

Chazy (Day Point, Crown Point): Chazy, Valcour and Sloop Islands, New York.

**AMBONYCHIA ERECTA** Hall. See *Clionychia erecta*.

**AMBONYCHIA EXCAVATA** Miller. See *Clionychia excavata*.

**Ambonychia illinoisensis** Worthen.

*Ambonychia illinoisensis* Worthen, Geol. Surv. Illinois, 6, 1875, p. 495, pl. 23, figs. 4a-b.

Richmond (Maquoketa): Savannah County, Illinois.

**AMBONYCHIA INTERMEDIA** Meek and Worthen. See *Byssonychia intermedia*.

**AMBONYCHIA JAMESI** Miller. See *Allonychia jamesi*.

**AMBONYCHIA LAMELLOSA** of authors. See *Clionychia lamellosa*.

**AMBONYCHIA MAXIMA** Safford.

*Ambonychia maxima* Safford, Geol. Tennessee, 1869, p. 287 (not defined).

Middle Nashville: Central Tennessee.

**AMBONYCHIA MYTILOIDES** Hall. See *Clionychia mytiloides*.

**AMBONYCHIA NEGLECTA** McChesney. See *Amphicœlia neglecta*.

**AMBONYCHIA NITIDA** Billings. See *Mytilarca nitida*.

**AMBONYCHIA OBESA** Miller. See *Byssonychia obesa*.

**AMBONYCHIA OBTUSA** Hall. See *Cyrtodonta obtusa*.

**Ambonychia orbicularis** (Emmons).

*Pterinea orbicularis* Emmons, Nat. Hist. New York, Geol., 2, 1842, pp. 395, 397, fig. 3.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, pp. 368, 369, fig. 3.



**Ambonychia orbicularis**—Continued.

*Posidonomya orbicularis* Emmons, Amer. Geol., 1, pt. 2, 1855, p. 176, pl. 13, figs. 18, 19.

*Ambonychia orbicularis* Hall, Pal. New York, 1, 1847, p. 164, pl. 36, figs. 5a-d.—Emmons, Man. Geol., 1860, p. 99, fig. 88.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 22, fig.

Trenton: Watertown and Middleville, New York.

**AMBONYCHIA PERANGULATA** Miller. See *Psilonychia perangulata*.

**Ambonychia planistriata** Hall.

*Ambonychia planistriata* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 32.—Ulrich Geol. Minnesota, 3, pt. 2, 1894, p. 491, pl. 35, figs. 3 and 4.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 58, pl. 7, figs. 3, 4.

Black River (Platteville): Mineral Point and Beloit, Wisconsin; Cannon Falls, Minnesota; Lee County, Illinois.

*Plesiotype*.—Cat. No. 46086, U.S.N.M.

**AMBONYCHIA RADIATA** of authors. See *Byssonychia radiata*.

**AMBONYCHIA RAUCHI** McChesney.

*Ambonychia Rauchi* McChesney, Desc. New Fossils, 1860, p. 89.

Maysville or Richmond: Madison, Indiana.

Observation.—Probably refers to some species of *Byssonychia*, but description is too poor for identification.

**AMBONYCHIA RETRORSA** Miller. See *Byssonychia retrorsa*.

**AMBONYCHIA ROBUSTA** Miller. See *Byssonychia robusta* and *B. richmondensis*.

**Ambonychia septentrionalis** Whiteaves.

*Ambonychia septentrionalis* Whiteaves, Geol. Surv. Canada, Ann. Rep. (n. s.), 14, App. F, 1904, p. 46; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 255, pl. 28, fig. 5.

Niagaran: Ekwan River, Canada.

**AMBONYCHIA STRLÆCOSTA** McChesney. See *Pterinea striæcosta*.

**AMBONYCHIA SUBUNDATA** Miller. See *Clionychia subundata*.

**AMBONYCHIA SUPERBA** Billings. See *Clionychia superba*.

**AMBONYCHIA SWANANA** Safford.

*Ambonychia Swanana* Safford, Geol. Tennessee, 1869, p. 287 (nom. nud.).

Upper Nashville: Central Tennessee.

**AMBONYCHIA TENUISTRIATA** Miller. See *Byssonychia tenuistriata*.

**AMBONYCHIA UNDATA** Hall. See *Clionychia undata*.

**Ambonychia undulata** (Whitfield).

*Leptodomus undulatus* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 81; Geol. Wisconsin, 4, 1882, p. 293, pl. 18, figs. 1, 2.

*Ambonychia undulata* Whiteaves, Ann. Rep. Geol. Surv. Canada (n. s.), 14, App. F, 1904, p. 46; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 254, pl. 28, fig. 4.

Niagaran: Wauwatosa, Wisconsin (Racine); Ekwan River, Canada.

**AMPHERISTOCRINUS** Hall.Genotype: *A. typus* Hall

*Ampheristocrinus* Hall, 11th Ann. Rep. Indiana Dept. Geol. Nat. Hist., 1882, p. 278, fig.—Trans. Albany Inst., 10, 1883, p. 67, fig. (Preliminary notice, 1879).—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 115, 143.—Miller, N. A. Geol. Pal., 1889, p. 223.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 18; Treatise on Zoology, pt. 3, Echinoderma, London, 1900, p. 173.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 67.

***Ampheristocrinus? calyx*** (Hall).

*Poteriocrinus? calyx* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 266, pl. 15, fig. 14; Trans. Albany Inst., 10, 1883, p. 66 (Preliminary notice, 1879).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 740, fig.

Niagaran (Waldron): Waldron, Indiana.

***Ampheristocrinus dubius*** Weller.

*Ampheristocrinus dubius* Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 67, pl. 14, fig. 11.

Niagaran (Racine): Romeo, Illinois.

***Ampheristocrinus typus*** Hall.

*Ampheristocrinus typus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 278, pl. 15, figs. 17, 18; Trans. Albany Inst., 10, 1883, p. 67 (Preliminary notice, 1879).—Miller, N. A. Geol. Pal., 1889, p. 223, text fig. 243.—Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 68.

Niagaran (Waldron): Waldron, Indiana.

**AMPHICÆLIA** Hall.Genotype: *A. leidyi* Hall.

*Amphicælia* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, (extras, 1865) p. 339; Rev. ed., p. 386.—Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 339, footnote; 3, 1868, p. 357.—Meek, Amer. Jour. Sci. Arts, 2d ser., 44, 1867, p. 173, footnote.—Miller, N. A. Geol. Pal., 1889, p. 461.

***Amphicælia costata*** (Hall and Whitfield).

*Amphicælia* (*Leptodomus?*) *costata* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 140, pl. 7, fig. 23.

*Amphicælia costata* Miller, N. A. Geol. Pal., 1889, p. 461, fig. 773.

Niagaran (Cedarville): Cedarville, Greene County, Ohio.

***Amphicælia leidyi*** Hall.

*Amphicælia leidyi* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1865), p. 339, pl. 14 (5), figs. 13–15, p. 387; Rev. ed., 1870, p. 387, pl. 14, figs. 13–15; p. 431, fig.; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 27, figs. 1, 2; mus. ed. 1879, p. 171, pl. 27, figs. 1, 2; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 313, pl. 28, figs. 1, 2.

*Leptodomus* (*Amphicælia*) *leidyi* Whitfield, Geol. Wisconsin, 4, 1882, p. 357 (gen. ref.)

Niagaran: Racine and Wauwatosa, Wisconsin; Bridgeport, Illinois (Racine); Waldron, Indiana; and Newsom, Tennessee (Waldron).

***Amphicælia neglecta*** (McChesney).

*Ambonychia neglecta* McChesney, Desc. New Fossils, 1861, p. 88.

*Pterinea neglecta* Winchell and Many, Mem. Boston Soc. Nat. Hist., 1, 1865, pp. 96, 108.

*Pterinea* (*Ambonychia*) *neglecta* McChesney, Plates Illust. New Sp. Fossils, 1865, pl. 9, figs. 2–2b.

*Leptodomus neglectus* Whitfield, Geol. Wisconsin, 4, 1882, p. 292, pl. 18, figs. 3, 4.



**Amphicœlla neglecta**—Continued.

*Amphicœlla neglecta* McChesney, Trans. Chicago Acad. Sci., 1, 1868, p. 41, pl. 9, fig. 2.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 358, pl. 5, fig. 9a, b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 66 (loc. occ.).—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 449, pl. 10, fig. 10.

Niagaran: Bridgeport, Illinois; Milwaukee, Wisconsin (Racine); Wabash, Indiana; Ontario (Guelph).

**Amphicœlla orbiculoides** (Grabau).

*Avicula?* *orbiculata* Hall (not Hall, 1843) Pal. New York, 2, 1852, p. 284, pl. 59, fig. 4.

*Lyriopecten orbiculoides* Grabau, Bull. New York State Mus., 45, 1901, p. 208; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 208.

*Amphicœlla orbiculata* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 2, 1899, p. 156 (gen. ref.).

Clinton (Rochester): Rochester, Niagara, etc., New York.

**Amphicœlla ulrichi** Maynard.

*Amphicœlla ulrichi* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 453, pl. 75, figs. 8–10.

Helderbergian (Keyser): Keyser, West Virginia.

**Amphidesma delafieldi** Castelnau.

Not recognized.

*Amphidesma delafieldi* Castelnau, Sil. Syst., 1843, p. 44, pl. 14, fig. 10.

Ordovician or Silurian: New York.

**AMPHIGRAPTUS** Lapworth.

Genotype: *Graptolithus divergens* Hall.

*Amphigraptus* Lapworth, Geol. Mag., 10, 1873, p. 559.—Zittel, Handb. Pal., 1, 1879, p. 298.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 55, 1883, p. 12.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 266.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Roemer and Frech, Leth. geog., 1 Theil. Leth. Pal., 1, 3 Lief., 1897, p. 587.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 121.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 270.

**Amphigraptus divergens** (Hall).

*Graptolithus divergens* Hall, Pal. New York, 3, 1859, p. 509, fig. 9; 12th Ann. Rep. New York State Cab. Nat. Hist., 1859, p. 57, fig. 9.—Canadian Org. Rem., Geol. Surv. Canada, dec. 2, 1865, p. 13, fig. 11.—Walcott, Trans. Albany Inst., 10, 1883, p. 35 (Adv. sheets 1879).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 264, fig.

*Graptolithus* (*Cœnograptus*) *divergens* Hall, 20th Ann. Rep., New York State Cab. Nat. Hist., 1868, p. 179, fig. 12; p. 226; rev. ed., 1868, p. 210, fig. 12; p. 223.

*Cœnograptus* (?*Pleurograptus*, ? *Pterograptus*) *divergens*, Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 587.

*Amphigraptus divergens* Lapworth, Geol. Mag., 10, 1873, p. 559; Cat. West Scot. Foss., 1876, p. 5, pl. 1, fig. 70; Quart. Jour. Geol. Soc. London, 34, 1878, p. 331; Ann. Mag. Nat. Hist., 6, 1880, p. 18; Trans. Royal Soc. Canada, 5, sec. 4, 1886, p. 184.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 338.—Elles and Wood, Mon. British Grapt., pt. 3, 1903, p. 122, fig. 73, pl. 18, fig. 1.—Ruedemann Mem. New York State Mus., 11, pt. 2, 1908, pp. 271–272, figs. 187–190, pl. 15, figs. 2, 3.

Chazyan: Kenwood and Glenmont, New York (Normanskill); England and Scotland (Hartfell).

**Amphigraptus multifasciatus** (Hall).

Graptolithus multifasciatus Hall, Pal. New York, 3, 1859, suppl., pp. 508, 509, fig. 8; 12th Ann. Rep. New York State Cab. Nat. Hist., 1859, pp. 56, 57, fig. 8; Can. Org. Rem., Geol. Surv. Canada, dec. 2, 1865, p. 10, fig. 7.—Walcott, Trans. Albany Inst., 10, 1883, p. 35 (Adv. sheets, 1879).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 266, fig.

Graptolithus (Monoprion) multifasciatus Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 176, fig. 8, p. 226; rev. ed., 1870, p. 208, fig. 8; p. 223.

Clematograptus multibrachiatus Lapworth, Ann. Mag. Nat. Hist., 6, 1880, p. 20.

Clematograptus multifasciatus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 652 (gen. ref.).—Lapworth, Proc. and Trans. Royal Soc. Canada, 4, 1887, p. 178.—Walcott, Bull. Geol. Soc. Amer. 1, 1890, p. 338.

Amphigraptus multifasciatus Elles and Wood, Mon. Brit. Graptolites, Pal. Soc., 1903, p. xlii (gen. ref.).—Ruedemann Mem. New York State Mus., 11, pt. 2, 1908, pp. 272–274, pl. 15, fig. 4.

Chazyan (Normanskill): Kenwood, near Albany, New York; Canada.

**AMPHILICHAS** Raymond.

Genotype: *Platymetopus lineatus* Angelin.

Platymetopus Angelin, Pal. Scand., 1854, p. 68; 3d ed., 1878, p. 68.—Nieszkowski, Archiv. f. Naturk. Liv-, Ehst-u. Kurl., (1), 1, 1857, p. 621.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, pp. 5, 29, 39, 49.—Zittel, Handb. Pal., 2, 1885, p. 623.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.—Koken, Die Leitfossilien, Leipzig, 1896, p. 30.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 67.—Gurich, Neues Jahrb. f. Min., Geol. Pal. Beilage-Band, 14, 1901, p. 524, pl. 20, fig. 19.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 62, 63, 81.—Raymond, Amer. Jour. Sci., 4th ser., 19, 1905, p. 377.

Paralichas Reed (new name for *Platymetopus*, preoccupied), Quart. Jour. Geol. Soc. London, 58, sec. F, 1902, pp. 80–82.

Amphilichas Raymond, Amer. Jour. Sci., 4th ser., 19, 1905, p. 378 (to replace the preoccupied names *Platymetopus* and *Paralichas*).—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308.—Slocum, Field Mus. Nat. Hist., Geol. Ser. 4, No. 3, 1913, p. 58.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 721

**Amphilichas bicornis** (Ulrich).

Lichas (Hoplolichas) bicornis Ulrich, Amer. Geol., 10, 1892, p. 272, fig. 2a, b.

Lichas (*Platymetopus*) bicornis Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 748, figs. 70, 71.

Richmond (Maquoketa): Spring Valley, Minnesota.

*Holotype*.—Cat. No. 41949. U.S.N.M.

**Amphilichas clermontensis** Slocum.

Amphilichas clermontensis Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 59, pl. 15, fig. 7.

Richmond (Maquoketa): Clermont, Iowa

**Amphilichas cucullus** (Meek and Worthen).

Lichas cucullus Meek and Worthen, Proc. Acad. Nat. Sci., Philadelphia, 1865, p. 266; Geol. Surv. Illinois, 3, 1868, p. 299.

Lichas (*Platymetopus*) cucullus Clarke, Geol. Minnesota, 3, 1894, p. 746, figs. 66, 67.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 236.

Black River: Alexander County, Illinois (Kimmswick); Janesville, Wisconsin; Lake Winnipeg, Canada.

Trenton (Prosser): Wykoff, Minnesota.



**Amphillechas halli** (Foerste).

Platynotus trentonensis (part) Hall, Pal. New York, 1, 1847, p. 235, pl. 64, fig. 1e (not 1a-d).

Lichas trentonensis Miller, N. A. Geol. Pal., 1889, p. 555, fig. 1026.

Lichas halli Foerste, Bull. Ser. Lab. Denison Univ., 3, 1888, p. 118, pl. 13, fig. 4.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 754.

Lichas faberi Miller, N. A. Geol. Pal., 1889, p. 554, fig. 1024.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Cotype*.—Cat. No. 43038, U.S.N.M.

**Amphillechas jukesii** (Billings).

Lichas Jukesii Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 282, fig. 269a, b; 335, figs. 323a, b.

Lichas (Platymetopus) jukesii Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, p. 29.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.

Chazyan (Quebec P.): Cow Head, Newfoundland; Stanbridge, Quebec.

**Amphillechas minganensis** (Billings).

Lichas Minganensis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 181, fig. 163a, b.

Lichas (Platymetopus) minganensis Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.

Platymetopus minganensis Raymond, Ann. Carnegie Mus., 3, 1905, p. 355, pl. 14, figs. 1-3; p. 366, figs. 7, 8.

Amphilichas minganensis Raymond, 7th Rep. State Geol. Vermont, 1910, p. 232, pl. 36, figs. 1-3, pl. 38, fig. 6, pl. 39, fig. 14; Ann. Carnegie Mus., 7, No. 1, 1910, p. 72, pl. 18, fig. 6, pl. 19, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308, fig. 1619.—Bassler, Bull. Virginia Geol. Surv., 2, A, 1909, p. 111, figs. 7, 8, 10.—Perkins, Rep. State Geol. Vermont, 8, 1912, pl. 18, fig. 6.

Lichas Champlainensis Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, p. 342, pl. 33, figs. 6-8.—Brainerd and Seely, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 22.

Chazyan: Large Island, Mingan Islands, and Montreal, Canada; Chazy, Valcour Island, etc., New York, Isle la Motte, Vermont (Day Point, Valcour); Lexington, Virginia (Liberty Hall).

**Amphillechas rhinoceros** Slocum.

Amphilichas rhinoceros Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 58, pl. 15, figs. 5-6.

Richmond (Maquoketa): Elgin, Iowa.

**Amphillechas robbinsi** (Ulrich).

Lichas (Hoplolichas) robbinsi Ulrich, Amer. Geol., 10, 1892, p. 271, fig. 1a, b.

Lichas (Platymetopus) robbinsi Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 747, figs. 68, 69.

Trenton (Prosser): Near Wykoff, Minnesota.

*Holotype*.—Cat. No. 41950, U.S.N.M.

**Amphillechas trentonensis** (Conrad).

Asaphus? Trentonensis Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 277, pl. 16, fig. 16.

Platynotus trentonensis Hall, Pal. New York, 1, 1847, p. 235, pl. 64, figs. 1a-d.

Lichas trentonensis Emmons, Amer. Geol., 1, pt. 2, 1855, pl. 15, figs. 2, 5, 18.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 127.—Rowley, Missouri Bur. Geol. Mines, 2d ser., 8, 1908, p. 58, pl. 15, figs. 4, 5.

**Amphilichas trentonensis**—Continued.

Lichas (*Platymetopus*) *trentonensis* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753, (gen. ref.).

*Platymetopus trentonensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 200, pl. 15, figs. 17–19.

*Amphilichas trentonensis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308.

Trenton: Near Carlisle, Pennsylvania; Middleville, etc., New York; Jacksonburg, New Jersey; Frankfort, Missouri.

**AMPHION CAYLEYI** Billings. See *Anacheirus? apollo*.

**AMPHION MULTISEGMENTATUS** Portlock. See *Encrinurus multisegmentatus*.

**AMPHISTROPHIA** Hall and Clarke. See *Strophonella* Hall.

**AMPHOTON** Lorenz. See *Dolichometopus Angelin*.

**AMPLEXOPORA** Ulrich.

Genotype: *A. cingulata* Ulrich.

*Amplexopora* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154.—Foord, Contr. Micro-Pal. Cambro.-Sil., 1883, p. 15.—Miller, N. A. Geol. Pal., 1889, p. 291.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 377, 450.—Ulrich, Zittel-Eastman Textb. Pal., 1896, p. 278.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 577.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 30.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 41.—Grabau and Shimer, N. A. Index Fossils, 1, 1904, p. 130.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 739.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 336.

**AMPLEXOPORA AFFINIS** Ulrich. See *Heterotrypa affinis*.

**Amplexopora ampla** Ulrich and Bassler.

*Amplexopora ampla* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 42, pl. 13, figs. 7, 8; pl. 14, fig. 3.

Maysville: Nashville and Columbia, Tennessee (Leipers); Cincinnati, Ohio (Fairmount).

*Cotypes*.—Cat. No. 42313, U.S.N.M.

**AMPLEXOPORA CANADENSIS** Foord. See *Batostoma canadense*.

**Amplexopora cingulata** Ulrich.

*Amplexopora cingulata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 254, pl. 11, figs. 5–5c.—Miller, N. A. Geol. Pal., 1889, fig. 449 (p. 292).—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 308, fig. 3c; p. 309, fig. 4c.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 193.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 55, pl. 3, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 131, fig. 186g.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 758, pl. 6, figs. 1, 1a; pl. 26, fig. 3.

Maysville (Fairmount): McKinneys Station and Boyle County, Kentucky; Cincinnati, Ohio.

*Cotypes*.—Cat. No. 43641, U.S.N.M.

**Amplexopora columbiana** Ulrich and Bassler.

*Amplexopora columbiana* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 41, pl. 13, figs. 1–4.—Hayes and Ulrich, Folio U. S. Geol. Surv., 95, 1903, illustration sheet, figs. 11, 12.

Maysville (Leipers): Columbia, etc., Tennessee.

*Cotypes*.—Cat. No. 43211, U.S.N.M.



**Amplexopora cylindracea** Ulrich and Bassler.

*Amplexopora cylindracea* Ulrich and Bassler, *Smiths. Misc. Coll.*, 47, 1904, p. 43, pl. 13, figs. 5, 6; pl. 14, figs. 4, 5.

Trenton (Catheys): Nashville, Tennessee.

*Cotypes*.—Cat. No. 43216, U.S.N.M.

**Amplexopora? discoidea** (Nicholson).

*Chaetetes discoideus* James, *Cat. Foss. Cincinnati group*, 1871 (not defined).—

Nicholson, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 511, pl. 30, figs. 4-4d; *Pal. Ohio*, 2, 1875, p. 206, pl. 21, figs. 15-15c; *Pal. Prov. Ontario*, 1875, pp. 10, 32; *Ann. Mag. Nat. Hist.*, 4th ser., 18, 1876, p. 88, pl. 5, figs. 7, 7a.

*Chaetetes* (*Monticulipora*) *discoideus* Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 153, fig.

*Monticulipora* (*Monotrypa*) *discoidea* Nicholson, *Genus Monticulipora*, 1881, p. 193, pl. 4, figs. 3, 3f.

*Amplexopora discoidea* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 255.—Foord, *Contr. Micro-Pal. Cambro-Sil.*, 1883, p. 17.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 11.

*Leptotrypa discoidea* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 6, 1883, p. 158.—Cumings, 32d *Ann. Rep. Dep. Geol. Nat. Hist. Res. Indiana*, 1908, p. 855, pl. 20, figs. 2-2f.

*Monticulipora discoidea* Hall, 12th *Ann. Rep. Indiana Geol. Nat. Hist.*, 1883, p. 247, pl. 10, figs. 4, 5.—James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 163.—Lesley, *Geol. Surv. Pennsylvania*, *Rep. P 4*, 1889, p. 420, figs.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 16, 1894, p. 178.

Maysville: Cincinnati, Ohio, and vicinity (Fairmount); Ontario (Pulaski).

**Amplexopora filiosa** (D'Orbigny).

*Monticulipora filiosa* D'Orbigny, *Prodr. de Pal.*, 1, 1850, p. 25.—Milne-Edwards, *Hist. nat. des Corall*, 3, 1860, p. 274.—James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 162.—J. F. James, *ibid.*, 15, 1893, p. 158.

*Chaetetes filiosa* Milne-Edwards and Haime, *Pol. Foss. Ter. Pal.*, 1851, p. 261.—Nicholson, *Pal. Ohio*, 2, 1875, p. 206.

*Leptotrypa filiosa* Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 456, pl. 36, figs. 7, 7a.

*Monotrypa? filiosa* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1883, p. 162.

*Amplexopora filiosa* Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 164.—Ulrich and Bassler, *Smiths. Misc. Coll.*, 47, 1904, p. 41, pl. 12, figs. 10, 11.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 12, pl. 3, figs. 1-3.—Cumings, 32d *Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1908, p. 765, pl. 5, fig. 2; pl. 7, figs. 1, 1b.

*Monticulipora subcylindrica* James, *Jour. Cincinnati Soc. Nat. Hist.*, 18, 1896, p. 123, fig. 13a-c.

Maysville (Fairmount-Corryville): Cincinnati, Ohio, and various localities in Ohio, Indiana, Kentucky, Tennessee, etc.

*Plesiotypes*.—Cat. No. 44070, U.S.N.M.

**Amplexopora granulosa** Cumings and Galloway.

*Amplexopora granulosa* Cumings and Galloway, 37th *Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1913, p. 69, pl. 1, figs. 1-1c.

Richmond (Liberty): Near Weisburg, Indiana.

**AMPLEXOPORA MULTISPINOSA** Cumings. See *Amplexopora septosa*.

**Amplexopora persimilis** Nickles.

*Amplexopora persimilis* Nickles, *Bull. Kentucky Geol. Surv.*, 5, 1905, p. 47, pl. 2, figs. 2, 3.

Eden (Economy): Cincinnati, Ohio, and vicinity.

**Amplexopora petasiformis** (Nicholson).

*Chaetetes petropolitanus* James, *Paleontologist*, No. 2, 1878, p. 11.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 31.

*Monticulipora* (*Monotrypa*) *petasiformis* Nicholson, *Genus Monticulipora*, 1881, p. 190, fig. 40.

*Monotrypa petasiformis* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 256; 6, 1883, p. 163.

*Monticulipora petasiformis* James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 168.—J. F. James, *ibid.*, 16, 1894, p. 186.

*Amplexopora petasiformis* Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 165.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 760, pl. 6, figs. 3, 3a; pl. 26, fig. 2.

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

**Amplexopora petasiformis welchi** (James).

*Monticulipora* (*Monotrypa*) *welchi* James, *Paleontologist*, No. 6, 1882, p. 50; No. 7, 1883, pl. 1, figs. 4-4c.

*Monticulipora petasiformis* var. *welchi* James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 169.—J. F. James, *ibid.*, 16, 1894, p. 187.

*Amplexopora petasiformis-welchi* Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 165.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 13.

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

**Amplexopora pumila** Cumings and Galloway.

*Amplexopora pumila* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 70, pl. 2, figs. 1-1e.

Richmond (Waynesville and Liberty): Near Weisburg, Indiana.

**Amplexopora pustulosa** Ulrich.

*Amplexopora pustulosa* Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 451, pl. 36, figs. 3-3c.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 761, pl. 6, figs. 4-4b; pl. 26, fig. 1.

*Monticulipora pustulosa* J. F. James, *Jour. Cincinnati Soc. Nat. Hist.*, 18, 1895, p. 72.

Richmond (Waynesville): Hanover, Clarksville, etc., Ohio; Indiana.

*Cotype*.—Cat. No. 44069 U.S.N.M.

**Amplexopora robusta** Ulrich.

*Amplexopora robusta* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 6, 1883, p. 82, pl. 1, figs. 1-1b.—Miller, *N. A. Geol. Pal.*, 1889, p. 292, fig. 450.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 318, fig. 7d.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 762, pl. 6, figs. 5, 5b.

Maysville (Bellevue): Cincinnati, Ohio, and vicinity; Indiana; Kentucky.

*Holotype*.—Cat. No. 43640 U.S.N.M.

**Amplexopora septosa** (Ulrich).

*Atactopora septosa* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1879, p. 125, pl. 12, figs. 7-7c.

*Monticulipora septosa* James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 180.—James, J. F., *ibid.*, 16, 1894, p. 203.

*Amplexopora septosa* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 255.—Nickles, *Bull. Kentucky Geol. Surv.*, 5, 1905, p. 52, pl. 3, fig. 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 763, pl. 6, figs. 6, 6b; pl. 26, fig. 4.

*Amplexopora multispinosa* Cumings, *Amer. Geol.*, 28, 1901, p. 376, pl. 34, figs. 7-10.



**Amplexopora septosa**—Continued.

*Amplexopora septosa* var. *multispinosa* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 765, pl. 6, figs. 2, 2b; pl. 26, fig. 5.

*Amplexopora septosa maculosa* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 71, pl. 3, figs. 1-1c.

*Amplexopora septosa minima* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 72, pl. 4, figs. 1-1d.

Eden (McMicken) and Maysville (Mt. Hope and Fairmount): Cincinnati, Ohio, and vicinity; Indiana and Kentucky.

*Cotypes*.—Cat. No. 43621 U.S.N.M.

**AMPLEXOPORA SEPTOSA MACULOSA** Cumings and Galloway. \* See *Amplexopora septosa*.

**AMPLEXOPORA SEPTOSA MINIMA** Cumings and Galloway. See *Amplexopora septosa*.

**AMPLEXOPORA SEPTOSA MULTISPINOSA** Cumings. See *Amplexopora septosa*.

**AMPLEXOPORA SUPERBA** Foord. See *Batostoma superbum* and *B. minnesotense*.

**AMPLEXOPORA WINCHELLI** Ulrich. See *Batostoma winchelli*.

**AMPLEXUS** Sowerby.

Genotype: *A. coralloides* Sowerby.

*Amplexus* Sowerby, Min. Conch., 1, 1814, p. 165.—Phillips, Pal. Foss. Cornwall, Devon and W. Somerset, 1841, p. 7.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 185.—Koninck, Desc. Animaux Fossiles, Leige, 1842, p. 26.—Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, Zoophytes, 1846, p. 357; Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 184.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr., Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 164, 342.—McCoy, British Pal. Rocks Foss., 1854, p. 70.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 452.—Billings, Canadian Jour. n. s., 4, 1859, p. 123.—Milne-Edwards Hist. Nat. d. Corall., 3, 1860, p. 347.—Koninck, Animaux Foss. Terr. Carb. Belgique (Mem. l'Acad. Royal Sci. de Belgique, 39), 1872, p. 63.—Dybowski, Archiv. f. Natur. Liv-Ehst-und Kurl., 5, 1873, p. 334.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 31.—Thomson and Nicholson, Ann. Mag. Nat. Hist., 4th ser., 16, 1875, p. 424.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 153.—Zittel, Handb. Pal., 1, 1879, p. 227.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 364.—Frech, Zeits. d. geol. Gesell., 37, 1885, p. 83.—Frech, in Dames & Kayser, Pal. Abhandl., 3, Heft 3, 1886, p. 97.—Miller, N. A. Geol. Pal., 1889, p. 171; 2d App., 1897, p. 726.—Sherzer, Amer. Geol., 7, 1891, pp. 278-283.—Koken, Die Leitfossilien, Leipzig, 1896, p. 313.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 123.—Zittel-Eastman Textb. Pal., 1, 1900, p. 76.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 128.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 76.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 58.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 83.

**AMPLEXUS ANNULATUS** Whitfield. See *Amplexus whitfieldi*.

**Amplexus cinctutus** Miller.

*Amplexus cinctutus* Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1893, p. 259, pl. 1, figs. 5, 6. (Adv. sheets, 1892, p. 5.)

Niagaran (Laurel): St. Paul, Indiana.

**Amplexus cingulatus** Billings.

*Amplexus cingulatus* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 106. (Adv. sheets, 1862.)—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 129, pl. 10, figs. 2, 3, 3a.

Silurian: L'Anse a la Barbe, Bay of Chaleurs, Quebec.

**Amplexus feildeni** Etheridge.

*Amplexus Feildeni* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 589, pl. 26, fig. 3.

Niagaran: Offley Island, Arctic America.

**Amplexus fenestratus** Whitfield.

*Amplexus fenestratus* Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 80; Geol. Wisconsin, 4, 1882, p. 278, pl. 15, figs. 1-3.

Niagaran (Waukesha-Racine): Cato, Cato Falls, and near Clarks Mills, Wisconsin.

**Amplexus junctus** Hall.

*Amplexus junctum* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 415 (ext. 1882, p. 11).

Niagaran: Port Byron, Illinois.

**AMPLEXUS LAXATUS** Billings. See *Pycnostylus guelphensis*.

**Amplexus phragmoceras** (Salter).

*Calophyllum Phragmoceras* Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, 1852, p. ccxxx, pl. 6, figs. 4, 4a.—Houghton, Jour. Geol. Soc. Dublin, 1, 1857, p. 245, pl. 8, fig. 1.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 585.

*Amplexus phragmoceras* Miller, N. A. Geol. Pal., 1889, p. 171 (gen. ref.).

Niagaran: Seal Island, Baring Bay, and Cape Hilgard, Arctic America.

**Amplexus septatus** Foerste.

*Amplexus septatus* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, No. 1, 1909, p. 8, pl. 1, figs. 12a, b; pl. 2, figs. 16 a-c.

Cayugan (Kokomo): Near Kokomo, Indiana.

**Amplexus shumardi** (Edwards and Haime).

*Cyathophyllum Shumardi* Milne-Edwards and Haime, Hist. Nat. Corall., 3, 1860, p. 372; Mon. Polyp. Foss. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 370, pl. 7, fig. 3.—Roemer, Sil. Fauna West Tennessee, 1860, p. 27, pl. 2, figs. 14, 14a.

*Amplexus shumardi* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 153, pl. 54.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 132, fig. 14; pl. 138, fig. 3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 24, fig.—Foerste, Jour. Geol., 11, 1903, p. 712.—Grabau and Shimer, N. A. Index Fossils 1, 1906, p. 59.

*Zaphrentis cinctosa* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 92.

*Zaphrentis shumardi* Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 121, pl. 8, figs. 3, 4.

Niagaran: Perry County, etc. Tennessee (Brownsport): Masonville, Iowa; Drummond Island, Point Detour, Cockburn Island, etc., Lake Huron; Louisville, Kentucky; Wisconsin, etc.

**Amplexus uniformis** Hall.

*Amplexus uniforme* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 415 (ext. 1882, p. 11).

Niagaran: Port Byron, Illinois.

**Amplexus whitfieldi** Miller.

*Amplexus annulatus* Whitfield (not Verneuil and Haime, 1850), Ann. Rept. for 1877, Wis. Geol. Surv., 1878, p. 80; Geol. Wisconsin, 4, 1882, p. 314, pl. 23, figs. 8-11.

*Amplexus whitfieldi* Miller, N. A. Geol. Pal., 2d App., 1897, p. 726.

Niagaran (Guelph): Sheboygan and Carlton, Wisconsin.



**AMPYX** Dalman.Genotype: *Ampyx nasutus* Dalman.

- Ampyx* Dalman, Svenska Vet.-Akad. Handl. for 1826, 1827, pp. 252, 279.—Dalman-Engelhart, Die Palæaden, Nurenberg, 1828, pp. 53, 72.—Eichwald, Zool. Specialis, Pt. 2, Vilnæ, 1830, p. 116.—Green, Mon. Tril. N. A., 1832, p. 19.—Edwards, Hist. Nat. d. Crustaces, 3, 1840, p. 296.—Portlock, Rep. Geol. Londonderry, 1843, p. 258.—Burmeister, Org. der Tril., Berlin, 1843, p. 128.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, p. 540, 542.—Emmrich, Neues Jahrb. f. Min., etc., 1845, p. 45.—Burmeister, Org. Tril., London, 1846, p. 110.—Hawle and Corda, Abh. d. k. Bohmischen Gesell. d. Wiss., 5 (extract), 1847, p. 38, pl. 3, fig. 19.—Forbes, Mem. Geol. Surv. United Kingdom, Dec. 2, 1849, pl. 10.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 780; Syst. Sil. du Centre Boheme, 1, 1852, p. 632.—McCoy, British Pal. Rocks Fossils, 1854, p. 147.—Pictet, Traite Pal., 2d ed., 2, 1854, p. 509.—Malaise, Desc. Terr. Sil. du Centre de la Belgique, 1873, p. 84.—Steinhardt, Beit. z. Naturk. Preus. Phys.-Oekon. Gesell., Königsberg, 1874, p. 38.—Angelin, Pal. Scandinavica, 3d ed., Holmiæ, 1878, p. 19.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 176.—Zittel, Handb. Pal., 2, 1885, p. 594.—Miller, N. A. Geol. Pal., 1889, p. 528.—Pompeckj, Beit. Phys.-Oekon. Gesell. Königsberg, 1890, p. 16.—Vogdes, Amer. Geol., 11, 1893, pp. 99–105.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7, ser., 42, 1894, p. 74.—Beecher, Amer. Jour. Sci., 3d ser., 49, 1895, p. 307.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15, fig. 8.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 105, 184, 186, pl. 3, fig. 13.—Frech, Leth. geog., 1, Th., Leth. Pal., 2, 1897, p. 32, footnote.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 51.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 32.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 712.
- Lonchodomas* Angelin, Pal. Scandinavica, 3d ed., Holmiæ, 1878, p. 80, pl. 40, fig. 11.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 177.—Zittel, Handb. Pal., 2, 1885, p. 594.—Pompeckj, Beit. Phys.-Oekon. Gesell. Königsberg, 1890, p. 16.—Vogdes, Amer. Geol., 11, 1893, p. 103.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 62, 1894, p. 75.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15.—Ruedemann, Bull. New York State Mus., 49, 1902, p. 51.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 712 (Genotype: *Ampyx rostratus* Sars).

***Ampyx americanus*** Safford and Vogdes.

- Ampyx Americanus* Safford and Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1889, p. 166, fig.—Vogdes, Amer. Geol., 11, 1893, p. 106, fig. 4.
- Ampyx jillsoni* Safford, Geol. Tennessee, 1869, p. 235 (nom. nud.).
- Chazy (Athens): Bulls Gap, near Russellville, Tennessee.

***Ampyx (Lonchodomas) halli*** (Billings).

- Ampyx halli* Billings, Rep. Econ. Geol., etc., Vermont, 1862, p. 231, fig. 365; Geol. Vt., 2, 1862, p. 959, fig. 365; Geol. Canada, Geol. Surv. Canada, 1863, p. 274, fig. 279a-c; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 24, text figs. 25a-c (Adv. sheets, 1861).—Vogdes, Amer. Geol., 11, 1893, p. 106, fig. 5.
- Ampyx (Lonchodomas) halli* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259, figs. 1548, 1549.
- Lonchodomas halli* Raymond, Ann. Carnegie Mus., 3, No. 2, 1905, p. 332, pl. 10, figs. 3–7; 7th Rep. State Geol. Vermont, 1910, p. 216, pl. 32, figs. 3–6.
- Chazy (St. Dominique, Canada; Highgate, Vermont; Valcour, etc., New York (Crown Point)).

**Ampyx (Lonchodomas) hastatus** Ruedemann.

*Ampyx (Lonchodomas) hastatus* Ruedemann, Bull. New York State Mus., 49, 1902, p. 48, pl. 3, figs. 1-10, 30.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**AMPYX JILLSONI** Safford. See *Ampyx americanus*.

**Ampyx (Lonchodomas) laeviusculus** (Billings).

*Ampyx laeviusculus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 295, fig. 285.

Chazy (Quebec-N): Table Head, Newfoundland.

**Ampyx niagarensis** Van Ingen.

*Ampyx niagarensis* Van Ingen, School of Mines Quart., 23, 1901, p. 53, fig. 15, pl. figs. 11, 11a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259, fig. 1550.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**Ampyx (Lonchodomas) normalis** (Billings).

*Ampyx normalis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 295, fig. 286.—Miller, N. A. Geol. Pal., 1889, p. 528, fig. 958.—Vogdes, Amer. Geol., 11, 1893, p. 107, fig. 6.

*Ampyx (Lonchodomas) normalis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259.

Chazy (Quebec-N, P.): Table Head and Pistolet Bay and four miles northeast of Portland Creek, Newfoundland.

**Ampyx quadricostatus** (Emmons).

*Microdiscus quadricostatus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 116, pl. 1, fig. 8; Man. Geol., 1860, p. 88, fig. 73.—Barrande, Bull. Soc. Geol. France, 2d ser., 18, 1861, p. 280, pl. 5, fig. 13.—Marcou, Mem. Boston Soc. Nat. Hist., 4, 1888, p. 128.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 405, fig.—Miller, N. A. Geol. Pal., 1889, p. 557, fig. 1033.

Chazy (Athens): Augusta County, Virginia.

**Ampyx (Lonchodomas) rutilius** (Billings).

*Ampyx rutilius* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 296.—Vogdes, Amer. Geol., 11, 1893, p. 108.

Chazy (Quebec-P.): Four miles northeast of Portland Creek, Newfoundland.

**Ampyx (Lonchodomas) semicostatus** (Billings).

*Ampyx semicostatus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 297, fig. 287.—Vogdes, Amer. Geol., 11, 1893, p. 108, fig. 6.

Chazy (Quebec-N, P.): Table Head, Pistolet Bay, and four miles northeast of Portland Creek, Newfoundland.

**AMYGDALOCYSTIS** Haeckel. See *Amygdalocystites* Billings.

**AMYGDALOCYSTITES** Billings.

Genotype: *A. florealis* Billings.

*Amygdalocystites* Billings, Canadian Jour., 2, 1854, p. 270; Geol. Surv. Canada, Rep. for 1853-1857, 1857, p. 288; Geol. Surv. Canada, dec. 3, 1858, p. 63.—Chapman, Expos. Min. and Geol. Canada, 1864, p. 109.—Zittel, Handb. Pal., 1, 1879, p. 413.—Billings, Trans. Ottawa Field Nat. Club, 1, No. 4, 1883, p. 51.—Miller, N. A. Geol. Pal., 1889, p. 223.—Jaekel, Zeits. d. d. geol. Gesell., 52, 1900, p. 675.—Zittel, Grundzuge Pal., 1, 1910, p. 184.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 462.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 151.

*Amygdalocystis* Haeckel, Amphor. und Cystoid., 1896, p. 106.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 58, fig. 29.



**Amygdalocystites florealis** Billings.

*Amygdalocystites florealis* Billings, Canadian Jour., 2, 1854, p. 270, figs. 4-6; Rep. Geol. Surv. Canada, 1857, p. 289; Canadian Org. Remains, dec. 3, Geol. Surv. Canada, 1858, p. 888, 63, pl. 6, fig. 1a-e; pl. 10 bis., fig. 12.—Chamberlin Geol. Wisconsin, 1, 1883, p. 154, fig.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 463, fig. 1769.

*Amygdalocystis florealis* Haeckel, Amphorideen u. Cystoideen, 1896, p. 106, fig. 15.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 57, fig. 19.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**Amygdalocystites florealis laevis** Billings.

*Amygdalocystites florealis* var. *laevis* Billings, Trans. Ottawa Field Nat. Club, 4, 1883, p. 52.

Trenton (Curdsville): Hull, Quebec.

**Amygdalocystites huntingtoni** Wetherby.

*Amygdalocystites huntingtoni* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 177, pl. 5, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 223, fig. 245.

Trenton (Curdsville): Mercer County, near High Bridge, Kentucky.

**Amygdalocystites radiatus** Billings.

*Amygdalocystites radiatus* Billings, Canadian Jour., 2, 1854, p. 271, figs. 7, 8; Rep. Geol. Surv. Canada, 1857, p. 289; Canadian Org. Rem., dec. 3, Geol. Surv. Canada, 1858, p. 65, pl. 6, figs. 3a, 3b; Trans. Ottawa Field Nat. Club, 1, No. 4, 1883, p. 51.

*Amygdalocystis radiatus* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**Amygdalocystites tenuistriatus** Billings.

*Amygdalocystites tenuistriatus* Billings, Canadian Journal, 2, 1854, p. 271, text fig. 9; Rep. Geol. Surv. Canada, 1857, p. 289; Canadian Org. Rem., dec. 3, Geol. Surv. Canada, 1858, p. 64, pl. 6, figs. 2a-f.

Trenton (Curdsville): Ottawa, Ontario.

**ANABAIA** Clarke.

Genotype: *A. paraia* Clarke.

*Anabaia* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 12.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 417.

**ANABAIA ANTICOSTIANA** Clarke. See *Camarotoechia decemplicata*.

**Anabaia paraia** Clarke.

*Anabaia paraia* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 12, pl. 2, figs. 1-9.

Silurian: Rio Trombetas, Brazil.

**ANACHEIRURUS** Reed.

Genotype: *Eccoptocheile frederici* Salter.

*Anacheirurus* Reed, Geol. Mag., dec. 4, 3, 1896, p. 119.

**Anacheirurus? apollo** (Billings).

*Cheirurus Apollo* Billings, Canadian Nat. Geol., 5, 1860, p. 322, fig. 28; Geol. Canada, Geol. Surv. Canada, 1863, p. 239, fig. 275; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 413, fig. 397.

*Ceraurus* (*Cyrtometopus*) *apollo* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738.

*Pseudosphærexochus apollo* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 36, pl. 4, figs. 1, 2.

**Anacheirurus? apollo**—Continued.

*Anacheirurus? apollo* Raymond and Barton, Bull. Mus. Comp. Zool., 54, No. 20, 1913, p. 543 (gen. ref.).

*Amphion Cayleyi* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 239, fig. 277; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 413, footnote, fig. 398.

Canadian or Ozarkian? (*Levis-erratic*): Point Levis, Quebec.

**ANAPHRAGMA** Ulrich and Bassler. Genotype: *A. mirabile* Ulrich and Bassler.

*Anaphragma* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 49.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 297.

**Anaphragma mirabile** Ulrich and Bassler.

*Anaphragma mirabile* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 49, pl. 13, figs. 9–11.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 298, 299, fig. 183.

Richmond: Wilmington, Illinois (Fernvale); Delafield and Iron Ridge, Wisconsin (Maquoketa); Island of Dago, Baltic Sea (Lyckholm).

*Cotypes* and *plesiotype*: Cat. Nos. 43218, 57385, U.S.N.M.

**ANASTROPHIA** Hall.

Genotype: *Pentamerus verneuili* Hall.

*Brachymerus* Shaler (not Dejean, 1834), Bull. Mus. Comp. Zool., 4, 1865, p. 69.—Zittel, Handb. Pal., 1, Munich, 1880, p. 694.—Koken, Die Leitfossilien, Leipzig, 1896, p. 244.

*Anastrophia* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 163; Pal. New York, 4, 1867, p. 374.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv. 1889, p. 47.—Miller, N. A. Geol. Pal., 1889, p. 333.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 224; 13th Ann. Rep. New York State Geol., 1895, p. 839.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 321.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 189; Bull. New York State Mus., 9, 1901, p. 189.

**Anastrophia brevirostris** (Hall).

?*Terebratula brevirostris* Sowerby, Murchison's Sil. Syst., 1839, p. 631, pl. 13, fig. 15.

*Atrypa brevirostris?* Hall, Pal. New York, 2, 1852, p. 278, pl. 58, fig. 1.

*Pentamerus brevirostris* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

*Rhynchonella brevirostris* Billings, Geol. Canada, 1863, p. 315, fig. 324.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1889, p. 884, fig.

*Anastrophia brevirostris* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 142.—Grabau, Bull. New York State Mus., 45, 1901, p. 190, fig. 102; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 190, fig. 102.

Clinton (Rochester): Lockport, etc., New York.

**ANASTROPHIA? HEMPLICATA** Winchell and Schuchert. See *Parastrophia hemiplicata*.**ANASTROPHIA? HEMPLICATA** var. **ROTUNDA** Winchell and Schuchert. See *Parastrophia hemiplicata rotunda*.**Anastrophia internascens** Hall.

*Anastrophia verneuili* Hall (not Hall, 1859), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1876, pl. 26, figs. 41–49.

*Anastrophia internascens* Hall, *ibid.*, 1879, p. 168, pl. 26, figs. 41–49; 11th Rep. State Geol. Indiana, 1882, p. 311, pl. 26, figs. 41–49.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 47, pl. 32, figs. 17–20.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 32, pl. 3, figs. 14–16.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 224, pl. 63, fig.



**Anastrophia internascens**—Continued.

30.—Miller, N. A. Geol. Pal., 1889, p. 333, text fig. 538.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 434, pl. 2, fig. 10.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 272, fig. 329.

Niagaran: Waldron, Indiana, and Newsom, Tennessee (Waldron and Laurel); Louisville, Kentucky (Louisville); Wabash, Indiana; Milwaukee, Wisconsin.

*Plesiotype*.—Cat. No. 51336, U.S.N.M.

**Anastrophia interplicata** (Hall).

*Atrypa interplicata* Hall, Pal. New York, 2, 1852, p. 275, pl. 57, fig. 2.

*Pentamerus interplicatus* Hall, 12th Rep. New York State Cab. Nat. Hist. 1859, p. 77.—Safford, Geol. Tennessee, 1869, p. 315, fig. 7.

*Anastrophia interplicata* Miller, Amer. Pal. Fossils, 1877, p. 104.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 224.—Grabau, Bull. New York State Mus., 45, 9, 1901, p. 190, fig. 101; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 190, fig. 101.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 272, fig. 238.

Niagaran: Lockport, etc., New York (Rochester); Louisville, Kentucky; Tennessee; Wisconsin.

**ANASTROPHIA REVERSA** Miller. See *Parastrophia reversa*.

**ANASTROPHIA? SCOFIELDI** Winchell and Schuchert. See *Parastrophia scofieldi*.

**ANASTROPHIA VERNEULI** Hall. See *Anastrophia internascens*.

**ANATINA? SINUATA** Hall. See *Ilionia sinuata*.

**ANAZYGA** Davidson. See *Zygospira* Hall.

**ANCISTROCERAS** Boll.

Genotype: *A. undulatum* Boll.

*Ancistroceras* Boll, Archiv. des Vereins der Freunde der Naturgisch. in Mecklenburg, 11, 1857, p. 87.—Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 509.—Remele, Zeits. d. d. geol. Gesell., 33, 1881, p. 184; *ibid.*, 34, 1882, p. 123.—Noetling, Jahrb. d. k. Preuss. Geol. Landesans. u. Bergak. fur 1883, 1884, p. 122, 130.—Koken, Die Leitfossilien, Leipzig, 1896, p. 50.

**Ancistroceras? dyeri** Hyatt.

*Ancistroceras? dyeri* Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 511.

Niagaran (Racine): Chicago, Illinois.

**ANGELLUM** Miller. See *Cyrtodonta* Billings.

**ANISOCRINUS** Angelin.

Genotype: *A. interradiatus* Angelin.

*Anisocrinus* Angelin, Icon. Crin. Suec., 1878, p. 13.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, Rev. Pal., 1, 1879, p. 37.—Zittel, Handb. d. Pal., 1, 4, 1879, p. 356.—Bather, Treatise on Zool., 3, 1900, p. 189.—Springer, Jour. Geol., 14, 1906, p. 479.

**Anisocrinus greenei** (Miller and Gurley).

*Lecanocrinus greenei* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 8, 1896, p. 52, pl. 3, fig. 28.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 748 fig., 1363.

*Anisocrinus greenei* Springer, Jour. Geol., 14, 1906, p. 480, pl. 6, fig. 11; Mon. Crin. Flex., Smiths. Inst. (in press).

Niagaran: Near Louisville, Kentucky (Louisville); Decatur County, Tennessee (Brownport).

**Anisocrinus oswegoensis** (Miller and Gurley).

*Lecanocrinus oswegoensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 4, 1894, p. 33, pl. 3, figs. 15-17.

*Anisocrinus oswegoensis* Springer, Jour. Geol., 14, 1906, p. 480, pl. 6, fig. 12; Mon. Crin. Flex., Smiths. Inst. (in press).

Niagaran: Oswego, Illinois.

**ANISOPHYLLUM** Edwards and Haime.

Genotype: *A. agassizi* Edwards and Haime.

*Anisophyllum* Edwards and Haime, Mon. Polyp. Foss. Ter. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 165, 354.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 453.—Milne-Edwards, Hist. Corall., 3, 1860, p. 354.—Dybowski, Archiv. Natur. Liv.-Ehst. und Kurl., 5, 1873, pp. 335, 396.—Zittel, Handb. Pal., 1, 1879, p. 229.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 370.—Miller, N. A. Geol. Pal., 1889, p. 172.—Sherzer, Amer. Geol., 7, 1891, pp. 278-285.

**Anisophyllum agassizi** Edwards and Haime.

*Anisophyllum agassizi* Edwards and Haime, Mon. Polyp. Foss. Ter. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 351, pl. 1, figs. 2, 2a.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 453, pl. 107, fig. 19.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 355.

Niagaran (Brownsport): Perry County, Tennessee.

**Anisophyllum? bilamellatum** Hall.

*Anisophyllum? bilamellatum* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 413 (ext. 1882, p. 9).

Niagaran (Louisville): Louisville, Kentucky.

**Anisophyllum trifurcatum** Hall.

*Anisophyllum trifurcatum* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 413 (ext. 1882, p. 9); 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 273, pl. 15, figs. 7, 8.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 26, text figs.

Niagaran (Louisville): Louisville, Kentucky.

**Anisophyllum unilargum** Hall.

*Anisophyllum unilargum* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 412 (ext. 1882, p. 8); 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 272, pl. 15, figs. 5, 6.—Miller, N. A. Geol. Pal., 1889, p. 172, text fig. 134.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 26, text figs.

Niagaran (Louisville): Louisville, Kentucky.

**ANODONTOPSIS** (part) Meek. See *Cycloconcha* Miller and *Ischyrodonta* Ulrich.

**ANODONTOPSIS** McCoy.

Genotype: *A. angustifrons* McCoy.

*Anodontopsis*, McCoy, Ann. Mag. Nat. Hist., 2d ser., 7, 1851, p. 53; Cont. British Pal., 1854, p. 188; Brit. Rocks and Foss., 1854, p. 270.—Pictet, Traite Pal., 2d ed., 3, 1855, p. 533.—Zittel, Handb. Pal., 2, 1881, p. 64.—Miller, N. A. Geol. Pal., 1889, p. 462.

**Anodontopsis austrina** Clarke.

*Anodontopsis austrina* Clarke, Archiv. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 16, pl. 2, fig. 12.

Silurian: Rio Trombetas, Brazil.

**Anodontopsis concinna** Whiteaves.

*Anodontopsis concinna* Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 1, 1884, p. 12, pl. 2, fig. 4; pl. 7, figs. 4, 4a; *ibid.*, 3, pt. 2, 1895, p. 67 (loc. occ.).

Niagaran (Guelph): Galt and Durham, Ontario.



*ANODONTOPSIS MILLERI* Meek. See *Cycloconcha milleri*.

**Anodontopsis putilla** Clarke.

*Anodontopsis putilla* Clarke, Archiv. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 16, pl. 2, figs. 10, 11.  
Silurian: Rio Trombetas, Brazil.

*ANODONTOPSIS?* *UNIONOIDES* Meek. See *Ischyrodonta unionoides*.

**Anodontopsis wabashensis** Kindle and Breger.

*Anodontopsis wabashensis* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 453, pl. 10, figs. 5-7.  
Niagaran: Wabash, Indiana.

**ANOLOTICHIA** Ulrich.

Genotype: *Anolotichia ponderosa* Ulrich.

*Anolotichia* Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 381, 473; Geol. Minnesota, 3, 1893, p. 326; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 91; Zittel-Eastman Textb. Pal., 1913, p. 328.

**Anolotichia impolita** (Ulrich).

*Crepidopora impolita* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 77.

*Anolotichia impolita* Ulrich, Geol. Minnesota, 3, 1893, p. 327, pl. 28, figs. 15-20; Zittel's Textb. Pal. (Eng. ed.), 1896, p. 268, fig. 437a-c.—Sardeson, Jour. Geol., 9, 1901, p. 13, pl. A, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123, fig. 182a.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 97, figs. 32, 33, pl. 7, fig. 11.—Zittel-Eastman Textb. Pal., 1913, p. 328, figs. 465a-c.

Black River (Decorah): Minneapolis, etc., Minnesota; Iowa.

Ordovician (Kuckers): Near Jewe, Esthonia, Russia.

*Cotypes* and *plesiotype*.—Cat. Nos. 43276, 57204, U.S.N.M.

**Anolotichia ponderosa** Ulrich.

*Anolotichia ponderosa* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 320, fig. 8c; p. 473, pl. 41, figs. 3-3d; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268, fig. 437d.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 465d.

Richmond (Fernvale): Wilmington, Illinois; Tennessee.

*Cotype*.—Cat. No. 43275, U.S.N.M.

**ANOMALOCRINUS** Meek and Worthen.

Genotype: *Heterocrinus?* *incurvus* Meek and Worthen.

*Heterocrinus?* subgenus *Anomalocrinus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 2d ser., 9, 1865, p. 148.

*Hybocrinus* (*Anomalocrinus*) Meek and Worthen, Geol. Rep. Illinois, 3, 1868, p. 327.

*Anomalocrinus* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 17.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 295 (Rev. Pal., pt. 1, p. 72); *ibid.*, 1886, pp. 110, 111, 116, 135; *ibid.*, 1890, pp. 378, 380.—Zittel, Handb. Pal., 1, 1879, p. 350.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 111; *ibid.*, 5, 1882, p. 38, pl. 5, figs. 3, 3a, 3e.—Miller, N. A. Geol. Pal., 1889, p. 223.—Bather, Ann. Mag. Nat. Hist., 6th ser, 5, 1890, p. 15, fig. 11; p. 332, pl. 14, fig. 8; pl. 15, fig. 10; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 20; Treatise on Zool. (Lankester), pt. 3, 1900, p. 146, fig. 58, 4.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 710.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501.—Zittel, Grundzuge Pal., 1, 1910, p. 151.—Springer, Zittel-Eastman Textb. Pal., 1913, p. 213.

**ANOMALOCRINUS**—Continued.

*Ataxiacrinus* Lyon, Trans. Amer. Phil. Soc., n. s., 13, 1869, p. 463.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 247 (Rev. Pal., pt. 2, p. 73).

*Ataxocrinus* Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 146.—Zittel, Grundzuge Pal., 1, 1910, p. 151.

**Anomalocrinus caponiformis** (Lyon).

*Ataxiacrinus caponiformis* Lyon, Trans. Amer. Phil. Soc., n. s., 13, 1869, p. 464, pl. 27, figs. 1-3.

*Anomalocrinus caponiformis* Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879 p. 109, pl. 9, figs. 4-4a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**Anomalocrinus incurvus** (Meek and Worthen).

*Heterocrinus* (*Anomalocrinus*) *incurvus*, Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 148.

*Hybocrinus*? (*Anomalocrinus*) *incurvus* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 327, text fig., pl. 4, figs. 3a, b.

*Anomalocrinus incurvus* Meek and Worthen, Geol. Surv. Ohio, 1, pt. 2, 1873, p. 17, pl. 2, figs. 6a-f.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 112; N. A. Geol. Pal., 1889, p. 224, fig. 246.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 716, pl. 3, figs. 1-1c.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501, fig. 1813.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

**ANOMALOCYSTIS** Haeckel. See *Anomalocystites* Hall.

**ANOMALOCYSTITES** Hall.

Genotype: *A. cornutus* Hall.

*Anomalocystites* Hall, Amer. Jour. Sci. Arts, 2d ser., 25, 1858, p. 279; Pal. New York, 3, 1859, p. 132.—Meek (part), Geol. Surv. Ohio, Pal., 1, 1873, p. 43.—Woodward, Geol. Mag., dec. 2, 7, 1880, pp. 193, 199.—Barrande, Syst. Sil. Center Boheme, 7, pt. 1, 1887, p. 89.—Miller, N. A. Geol. Pal., 1889, p. 224.—Jaekel, Zeits. d. d. geol. Ges., 52, 1900, p. 668.—Zittel-Eastman Textb. Pal., 1, 1900, p. 186.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 51.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 204.—Zittel, Grundzuge Pal., 1, 1910, p. 182.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 150.

*Ateleocystites* Woodward (part), Geol. Mag., dec. 2, 7, 1880, p. 193.

*Anomalocystis* Haeckel, Amphoroideen und Cystoideen, 1896, p. 40.

**ANOMALOCYSTITES** (**ATELEOCYSTITES**) **BALANOIDES** Meek. See *Ateleocystites balanoides*.

**Anomalocystites cornutus** Hall.

*Anomalocystites cornutus* Hall, Pal. New York, 3, 1859, p. 133, pl. 7A, figs. 5-7.—Woodward, Geol. Mag., dec. 2, 7, 1880, p. 193, pl. 6, figs. 4, 5.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 206, pl. 40, figs. 4, 5.

*Anomalocystis cornuta* Haeckel, Amphoroideen und Cystoideen, 1896, p. 41, pl. 2, figs. 8, 9.

Helderbergian (Manlius transition beds or Coeymans): Litchfield, Herkimer County, New York.

*Plesiotypes*.—Cat. Nos. 35078, 35079, U.S.N.M.

**ANOMALOCYSTITES HUXLEYI** Miller. See *Ateleocystites huxleyi*.



**ANOMALODONTA** Miller.Genotype: *A. gigantea* Miller.

*Anomalodonta*, Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 16; 2, 1875, p. 280.—White, Amer. Jour. Sci. Arts, 3d ser., 8, 1874, pp. 218, 219.—Zittel, Handb. Pal., 2, 1881, p. 36.—Miller, N. A. Geol. Pal., 1889, p. 462.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 636.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 978.—Grabau and Shimer, N. A. Index Fossils, 1 1909, p. 430.

**Anomalodonta alata** (Meek).

*Ambonychia* (Megaptera) *alata* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 319; Geol. Surv. Ohio, Pal., 1, 1873, p. 131, pl. 11, fig. 9; pl. 12, fig. 10. Megaptera *alata* White, Cincinnati Quart. Jour. Sci., 1, 1874, p. 327. *Anomalodonta alata* Miller, Cincinnati Quart. Jour. Sci., 1874, p. 16, pp. 223, 328.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 638, pl. 46, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431. Richmond (Arnheim and Waynesville): Morrow, Clarksville, etc., Ohio; Versailles, etc., Indiana. *Plesiotype*.—Cat. No. 46087, U.S.N.M.

**Anomalodonta casei** (Meek and Worthen).

*Ambonychia* (Megaptera) *Casei* Meek and Worthen, Proc. Chicago Acad. Sci., 1, 1866, p. 22.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 133, pl. 11, fig. 8.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 491, pl. 1, figs. 1, 2. Megaptera *Casei* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 337, pl. 4, fig. 9a, b. *Anomalodonta casei* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 15, 16, p. 224. Richmond (Whitewater): Richmond, Indiana.

**Anomalodonta costata** (Meek).

*Ambonychia costata* James, Cat. Low. Sil. Fossils Cincinnati Group, 1871, p. 13 (not described).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 130, pl. 12, figs. 5a, b, c.—Miller, Cincinnati Quart. Jour. Sci., 1, p. 15. *Anomalodonta costata* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 987, pl. 62, figs. 6–6a. Richmond (Arnheim and Waynesville): Clarksville, etc., Ohio.

**Anomalodonta gigantea** Miller.

*Anomalodonta gigantea* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 17, figs. 7, 8, 9; also p. 327; N. A. Geol. Pal., 1889, p. 462, figs. 776, 777; p. 463, fig. 778.—Ulrich, Geol. Surv. Ohio, 7, 1895, p. 637, pl. 50, figs. 1 to 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 968, pl. 43, figs. 1–1b. Richmond (Arnheim-Whitewater): Versailles, etc., southeastern Indiana; Ohio. *Plesiotype*.—Cat. No. 46088, U.S.N.M.

**Anomalodonta plicata** Ulrich.

*Anomalodonta plicata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 638, pl. 46, figs. 2, 3. Maysville (Corryville): Cincinnati, Ohio. *Holotype*.—Cat. No. 46089, U.S.N.M.

**ANOMALOIDES** Ulrich.Genotype: *A. reticulatus* Ulrich.

*Anomaloides* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 92.—James, J. F., *ibid.*, 8, 1885, pp. 165, 166.—Ulrich, Amer. Geol., 1, 1888, p. 324. *Anomalospongia* Ulrich, Geol. Minnesota, 3, pt. 1, 1895, pp. 68–69 (ext. 1893).

**Anomaloides reticulatus** Ulrich

*Anomaloides reticulatus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 92, pl. 4, figs. 6, 6a-b.

*Anomalospongia reticulata* Ulrich, Geol. Minnesota, 3, pt. 1, 1895, p. 71, fig. 1, pl. F, figs. 13-15 (ext. 1893).

*Receptaculites reticulatus* James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1885, p. 166; 9, 1886, p. 249; 14, 1891, p. 62.

Maysville (Mt. Hope): Covington, Kentucky.

*Cotypes*.—Cat. No. 46546, U.S.N.M.

**ANOMALOSPONGIA** Ulrich. See *Anomaloides* Ulrich.

**ANOMIA BILOBA** Linnæus. See *Bilobites bilobus*.

**ANOMIA RETICULARIS** Linnæus. See *Atrypa reticularis*.

**ANOMITES EXPORRECTUS** Wahlenberg. See *Cyrtia exporrecta*.

**ANOMITES LENTICULARIS** Wahlenberg. See *Eoorthis* (*Orusia*) *lenticularis*.

**ANOMITES TRANSVERSALIS** Wahlenberg. See *Plectambonites transversalis*.

**ANOMOCARE** Angelin.

Genotype: *A. læve* Angelin.

*Anomocare* Angelin, Pal. Scandinavica, 3d ed., 1878, p. 24.—Zittel, Handb. Pal., 2, 1885, p. 601.—Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 60.—Koken, Die Leitfossilien, Leipzig, 1896, p. 22.—Walcott, Smiths. Misc. Coll., 57, No. 4, 1911, p. 87; Research in China, 3, Carnegie Institution, 1913, p. 187 (figures genotype).

**Anomocare parvula** Weller.

*Anomocare parvula* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 120, pl. 3, fig. 12.

Upper Cambrian or Ozarkian (Kittatinny): Newton, New Jersey.

**ANOMOCARE SPINIGER** Matthew. See *Acantholenus spiniger*.

**Anomocare stenotoides** (Matthew).

*Leptoplastus stenotoides* Matthew, Canadian Rec. Sci., 3, 1889, p. 486, fig. 2.

*Anomocare stenotoides* Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 61, pl. 13, fig. 3 a-d; Bull. Nat. Hist. Soc. New Brunswick, 16, 1898, p. 42;

Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 139, pl. 2, figs. 5 a-i.

Canadian (Bretonian—Div. C 3b): Long Island, Kennebecasis River, New Brunswick.

**ANOMOCARELLA** Walcott.

Genotype: *A. chinensis* Walcott.

*Anomocarella* Walcott, Proc. U. S. Nat. Mus., 29, 1905, p. 54; Smiths. Misc. Coll., 57, 1911, p. 91; Research in China, 3, Carnegie Inst., 1913, p. 195.

**Anomocarella belli** (Billings).

*Dikelocephalus belli* Billings, Canadian Nat. Geol., 5, 1860, p. 311, fig. 7; Geol.

Canada, Geol. Surv. Canada, 1863, p. 236, fig. 260; Pal. Foss., 1, Geol. Surv.

Canada, 1865, p. 403, fig. 378.

*Dicelloccephalus belli* Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

*Anomocarella belli* Walcott, Smiths. Misc. Coll., 57, 1914, p. 349 (gen. ref.).

Ozarkian? (Levis—erratic): Point Levis, Quebec.



**Anomocarella? oweni** (Billings).

Dikelocephalus Oweni Billings, Canadian Nat. Geol. 5, 1860, p. 310, fig. 8; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 259; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 402, fig. 379.

Dicelloccephalus Oweni Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Anomocarella? oweni Walcott, Smiths. Misc. Coll., 57, 1914, p. 251 (gen. ref.).

Ozarkian? (Levis—erratic): Point Levis, Quebec.

**Anomocarella? planifrons** (Billings).

Dikelocephalus planifrons Billings, Canadian Nat. Geol., 5, 1860, p. 309, fig. 6; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 256; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 401, fig. 377.

Dicelloccephalus planifrons Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Anomocarella? planifrons Walcott, Smiths. Misc. Coll., 57, 1914, p. 352 (gen. ref.).

Ozarkian? (Levis—erratic): Point Levis, Quebec.

**ANOMOCLONELLA** Rauff.

Genotype: *A. zitteli* Rauff.

Anomoclonella Rauff, Palæontographica, 41, 1895, p. 226.

**Anomoclonella zitteli** (Rauff).

Anomoclonella Zitteli Rauff, Palæontographica, 40, 1894, pl. 8, figs. 1-4; 41, 1895, pp. 226-242, figs. 78-83.

Niagaran (Brownsport): Decatur County, Tennessee.

**ANOPLOTHECA** (part) of authors. See *Cœlospira* Hall.

**ANOPTERA** Ulrich.

Genotype: *A. miseneri* Ulrich.

Anoptera Ulrich, Geol. Surv. Ohio, 7, 1893, p. 649.

**Anoptera miseneri** Ulrich.

Anoptera miseneri Ulrich, Geol. Surv. Ohio, 7, 1893, p. 650, pl. 50, figs. 5-9.

Richmond: Clarksville, Ohio (Waynesville); Richmond, Indiana (Whitewater).

*Cotypes*.—Cat. Nos. 46090, 46091, U.S.N.M.

**ANORTHASTER** Schuchert.

Genotype: *Palæaster miamiensis* Miller

Anorthaster Schuchert in Frech, Cat. Foss., 1, Anim., pt. 3, 1914, p. 11 (nom. nud.); Bull. U. S. Nat. Mus., 88, 1915, p. 125.

**Anorthaster miamiensis** (Miller).

Palæaster miamiensis Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 143, pl. 4, fig. 3.—James, Ibid. 18, 1895, p. 129.

Anorthaster miamiensis Schuchert, in Frech, Cat. Foss., 1, Anim., pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 127, pl. 13, fig. 4; pl. 20, fig. 1.

Richmond (Waynesville or Liberty): Waynesville, Ohio.

*Holotype*.—Cat. No. 40880, U.S.N.M.

**ANTHASPIDELLA** Ulrich and Everett.

Genotype: *A. mammulata* Ulrich and Everett.

Anthaspidella Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 256.—Miller, N. A. Geol. Pal., 1889, p. 153.

**Anthaspidella fenestrata** Ulrich and Everett.

Anthaspidella fenestrata, Ulrich and Everett, Geol. Surv. Illinois, 1890, p. 264, pl. 2, fig. 1.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella firma** Ulrich and Everett.

*Anthaspidella firma* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 263, pl. 2, figs. 3, 3a.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella florifera** Ulrich and Everett.

*Anthaspidella florifera* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 259, pl. 1, fig. 2; pl. 4, fig. 2.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella grandis** Ulrich and Everett.

*Anthaspidella grandis* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 262, pl. 2, figs. 2, 2a.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella? magnifica** Ulrich and Everett.

*Anthaspidella? magnifica* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 265, pl. 8, figs. 2, 2a-c.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella mammulata** Ulrich and Everett.

*Anthaspidella mammulata* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 258, pl. 1, figs. 1, 1a-d.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella obliqua** Ulrich and Everett.

*Anthaspidella obliqua* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 265, pl. 4, figs. 1, 1a.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella parvistellata** Ulrich and Everett.

*Anthaspidella parvistellata* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 260, pl. 1, fig. 3.

Black River (Platteville): Near Dixon, Illinois.

**Anthaspidella scutula** Ulrich and Everett.

*Anthaspidella scutula* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 261, pl. 3, fig. 1, 1a.

Black River (Platteville): Near Dixon, Illinois.

**ANTHES** Goldfuss. See *Peltura* Milne-Edwards.

**ANTHOCRINUS** Müller. See *Cyathocrinus* Miller.

**ANTHOCYSTIS** Haeckel. See *Callocystites* Hall.

**ANTHOCYSTIS** HALLIANA Haeckel. See *Callocystites* jewetti.

**ANTHOPHYLLUM DENTICULATUS** Goldfuss. See *Zaphrentis denticulatus*.

**ANTHOPHYLLUM EXPANSUM** Owen. See *Ptychophyllum expansum*.

**ANTIRHYNCHONELLA** Quenstedt. See *Conchidium* Linnaeus.

**APARCHITES** Jones.

Genotype: *A. whiteavesi* Jones.

*Aparchites* Jones, Ann. Mag. Nat. Hist., 6th ser., 3, 1889, p. 384.—Miller, N. A. Geol. Pal., 1889, p. 529.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 643; Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 343.—Bassler, Zittel-Eastman Textb. Pal., 2d. ed., 1913, p. 737.



**Aparchites arrectus** Ulrich.

*Aparchites arrectus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 646, pl. 43, figs. 35, 36.

Black River (Decorah): St. Paul, Minnesota.

*Holotype*.—Cat. No. 41836, U.S.N.M.

**Aparchites billingsi** (Jones).

*Leperditia Billingsi* Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 345, pl. 20, fig. 9.

*Aparchites billingsii* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 231.

Silurian or Devonian: Lake Winnipegosis, Canada.

**Aparchites chatfieldensis** Ulrich.

*Aparchites chatfieldensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 646, pl. 43, figs. 37, 38.

Black River (Decorah): Chatfield, Minnesota.

*Holotype*.—Cat. No. 41829 U.S.N.M.

**Aparchites concinnus** (Jones).

*Cytheropsis concinna* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 249, pl. 10, figs. 3, 4; Geol. Surv. Canada, dec. 3, 1858, p. 99.

*Primitia concinna* Jones and Holl, Ann. Mag. Nat. Hist., 3d ser., 16, 1865, p. 424.

*Aparchites concinnus* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 99.

Black River (Leray): Pauquettes Rapids, Allumette Island, Ottawa River, Canada.

**Aparchites ellipticus** Ulrich.

*Aparchites ellipticus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 644, pl. 43, figs. 15-17.

Black River (Decorah): Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 41832 U.S.N.M.

**Aparchites fimbriatus** (Ulrich).

*Leperditia fimbriata* Ulrich, Amer. Geol., 10, 1892, p. 268, pl. 9, figs. 34-36.

*Aparchites fimbriatus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 645, pl. 45, figs.

10-12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 343, fig. 1657b.

Richmond (Maquoketa): Spring Valley, Minnesota.

*Holotype*.—Cat. No. 41834, U.S.N.M.

**Aparchites gordonii** Ulrich and Bassler.

*Aparchites gordonii* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 515, pl. 95, figs. 1-3.

Helderbergian (Keyser): Cumberland, Maryland.

*Holotype*.—Cat. No. 53283, U.S.N.M.

**Aparchites granilabiatus** (Ulrich).

*Leperditia granilabiata* Ulrich, Amer. Geol., 10, 1892, p. 267, pl. 9, figs. 31-33.

*Aparchites granilabiatus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 644, pl. 45, figs. 21-23.

Black River (Decorah): St. Paul, Minnesota.

*Holotype*.—Cat. No. 41828, U.S.N.M.

**Aparchites granilabiatus neglectus** Ulrich.

*Aparchites granilabiatus neglectus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 645.

Black River (Decorah): Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 41835, U.S.N.M.

**Aparchites millepunctatus** (Ulrich).

*Leperditia millepunctata* Ulrich, Amer. Geol., 10, 1892, p. 268, pl. 9, figs. 37-39.

*Aparchites millepunctatus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 645, pl. 45, figs. 16-18.

Black River (Decorah): Fountain, Minnesota.

*Holotype*.—Cat. No. 41837, U.S.N.M.

**Aparchites minutissimus** (Hall).

*Leperditia* (*Isochilina*) *minutissima* Hall, 24th Rep. New York State Cab. Nat.

Hist., 1872, p. 231, pl. 8, fig. 13 (adv. sheet 1871, p. 7).—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 102, pl. 4, fig. 4.

*Leperditia minutissima* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 122.

*Aparchites minutissimus* Ulrich, Geol. Surv. Canada, Cont. Micro-Pal., pt. 2, 1889, p. 49, pl. 9, fig. 5.—Whiteaves, *ibid.*, Pal. Foss., 3, pt. 2, 1895, p. 126 (loc. occ.).

Eden-Richmond: Cincinnati, Ohio, and vicinity; Stony Mountain, Manitoba, Anticosti, etc.

**Aparchites minutissimus robustus** Ruedemann.

*Aparchites minutissimus* var. *robustus* Ruedemann, Bull. New York State Mus., 49, 1901, p. 74, pl. 7, figs. 6-11.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Aparchites minutissimus trentonensis** Ulrich.

*Aparchites minutissimus* var. *trentonensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 646, pl. 43, figs. 18-20.

Black River (Decorah) and Trenton (Prosser): Fountain, Cannon Falls, etc., Minnesota.

*Cotypes*.—Cat. Nos. 41302, 41303, U.S.N.M.

**Aparchites mundulus** Jones.

*Aparchites mundulus* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 62, pl. 10, figs. 12a, b.

Trenton: Falls of Lorette, Quebec.

**Aparchites oblongus** Ulrich.

*Aparchites oblongus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 137, pl. 10, figs. 10a-10c.

Richmond (Arnheim): Middletown, Ohio.

*Holotype*.—Cat. No. 41811, U.S.N.M.

**Aparchites parvulus** Jones.

*Aparchites parvulus* Jones, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 230, pl. 22, figs. 4a-4c.

Black River or Richmond: Little Black Island, Lake Winnipeg, Canada.

**Aparchites tyrrelli** Jones.

*Aparchites Tyrrellii* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 62, pl. 13, figs. 14a-c.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 242 (loc. occ.).

Black River or Richmond: Great Black Island, Like Winnipeg, Canada.

**APARCHITES UNICORNIS** Ulrich. See *Primitiella unicornis*.**Aparchites whiteavesi** Jones.

*Aparchites Whiteavesi* Jones, Ann. Mag. Nat. Hist., 6th ser., 3, 1889, p. 384, figs. 5, 6, pl. 17, fig. 10.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 230.

Black River or Richmond: Lower Fort Garry, St. Andrew, Manitoba.



- APATOKEPHALUS** Brögger. Genotype: *Trilobites serratus* Boeck.  
*Apatokephalus* Brögger, *Nyt. Mag. f. Naturvid.*, 36, 1897, p. 184.  
 Tramoria Reed, *Quart. Jour. Geol. Soc. London*, 55, 1899, p. 758, pl. 49, figs. 14-16;  
*Geol. Mag.*, dec. 4, 7, 1900, p. 46.

***Apatokephalus corax* (Billings).**

- Dikelocephalus?* *corax* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 334,  
 fig. 322a, b.—Matthew, *Trans. Royal Soc. Canada*, 10, sec. 4, 1893, p. 11, foot-  
 note.  
 Ozarkian ? (Levis—erratic): Point Levis, Quebec.

***Apatokephalus finalis* (Walcott).**

- Dicelloccephalus finalis* Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 89, pl. 12,  
 figs. 12, 12a, 22.—Matthew, *Trans. Royal Soc. Canada*, 10, sec. 4, 1893, p. 11,  
 footnote.  
*Apatokephalus finalis* Brögger, *Nyt. Mag. f. Naturvid.*, 1897, p. 175, fig. 6a, p. 184.  
 Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.  
*Cotypes*.—Cat. No. 24563, U.S.N.M.

- APATOKEPHALUS MAGNIFICUS** Brögger. See *Hungaia magnifica*.

- APATOKEPHALUS SCHLOTHEIMI** Billings. See *Remopleurides?* *schlotheimi*.

**APHETOCERAS** Hyatt.

Genotype: *A. americanum* Hyatt.

- Aphetoceras* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 447.—Miller, *N. A. Geol.*  
*Pal.*, 2d App., 1897, p. 771.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910,  
 p. 65.

***Aphetoceras americanum* Hyatt.**

- Aphetoceras americanum* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 447, pl. 6,  
 figs. 5-8.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 65.  
 Canadian: Port au Choix, Newfoundland.

***Aphetoceras attenuatum* Hyatt.**

- Lituites farnsworthi* Billings (part), *Geol. Surv. Canada, Pal. Foss.*, 1, 1861, p. 21.  
*Aphetoceras attenuatum* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 449.—Ruede-  
 mann, *Bull. New York State Mus.*, 90, *Pal.*, 14, 1906, p. 475.  
 Canadian (Beekmantown): Phillipsburg, Missisquoi County, Quebec.

***Aphetoceras boreale* Hyatt.**

- Aphetoceras boreale* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 448, pl. 5, figs.  
 15-17.  
 Canadian: Schooner Island, Newfoundland.

***Aphetoceras complanatum* (Shumard).**

- Lituites complanata* Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1863, p. 107.—  
 Keyes, *Missouri Geol. Surv.*, 5, 1895, p. 225.  
*Aphetoceras complanatum* Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 771 (gen.  
 ref.).  
 Canadian (Yellville): Ozark County, Missouri.

***Aphetoceras farnsworthi* (Billings).**

- Lituites Farnsworthi* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 21, fig.  
 24 (adv. sheets, 1861); *Geol. Vermont*, 2, 1862, p. 958, fig. 364; *Rep. Econ.*  
*Geol.*, etc., Vermont, 1862, p. 230, fig. 364; *Geol. Canada, Geol. Surv. Canada*,  
 1863, p. 277, fig. 283.—Lesley, *Geol. Surv. Pennsylvania, Rep. P 4*, 1889, p.  
 354, fig.

**Aphetoceras farnsworthi**—Continued.

*Aphetoceras farnsworthi* Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 448.—Ruedemann, Bull. New York State Mus., 90, Pal., 14, 1906, p. 473, fig. 24.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 65, fig. 1273.

Canadian (Beekmantown): Phillipsburg, Missisquoi County, Quebec.

**APHYLLOSTYLUS** Whiteaves.

Genotype: *A. gracilis* Whiteaves.

*Aphylostylus* Whiteaves, Ottawa Naturalist, 18, 1904, p. 113.

**Aphylostylus gracilis** Whiteaves.

*Aphylostylus gracilis* Whiteaves, Ottawa Nat., 18, 1904, p. 114; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 278, pl. 24, figs. 1, 1a.

Niagaran: Stonewall, Manitoba.

**APIOCERAS** Saemann. See *Poterioceras* McCoy.

**APIOCRINITE**(?) Anthony. See *Glyptocrinus decadactylus*.

**APIOCYSTIS** Haeckel. See *Apiocystites* Forbes.

**APIOCYSTITES** Hall. See *Hallicystis* Jaekel.

**APIOCYSTITES** Jaekel. See *Lepocrinites* Conrad.

**APIOCYSTITES** Forbes.

Genotype: *A. pentrematoides* Forbes.

*Apiocystites* Forbes, Mem. Geol. Surv. Great Britain, 2, pt. 2, 1848, pp. 501, 503.—Hall, Pal. New York, 2, 1852, p. 242.—Muller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 248.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 298.—Chapman, Canadian Jour., n. s., 2, 1857, p. 303.—Hall, Pal. New York, 3, 1861, pp. 126, 151.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 354.—Miller, N. A. Geol. Pal., 1889, p. 224.—Jaekel, Stammesg. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 279 (part).—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 210.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 154.

*Apiocystis* Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 132.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 61.—Zittel, Grundzuge Pal., 1, 1910, p. 187.

*Lepadocrinus* Bather (part), Treatise on Zool. (Lankester), pt. 3, 1900, p. 61.

**APIOCYSTITES CANADENSIS** Billings. See *Callocystites canadensis*.

**Aplocystites elegans** (Hall).

*Aplocystites elegans* Hall, Pal. New York, 2, 1852, p. 243, pl. 51, figs. 1-17.—Jaekel, Stammesg. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 282.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 212, pl. 34, figs. 4, 5.

*Aplocystis elegans* Haeckel, Amphorideen u. Cystoideen, 1896, pl. 3, figs. 4-9. Clinton (Rochester): Lockport, New York; Grimsby, Ontario.

**APIOCYSTITES GEBHARDII** Jaekel. See *Lepocrinites gebhardi*.

**APIOCYSTITES HURONENSIS** Billings. See *Brockocystis huronensis*.

**APIOCYSTITES IMAGO** Hall. See *Hallicystis imago*.

**APIOCYSTITES TECUMSETH** Billings. See *Brockocystis tecumseth*.

**APLOCRINUS** D'Orbigny. See *Haplocrinus* Steining.

**APSIDOCERAS** Hyatt.

Genotype: *Gyroceras* (Lituities) *magnificum* Billings.

*Apsidoceras* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 289.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 695.



*Apsidoceras insigne* Whiteaves. See *Litoceras insigne*.

***Apsidoceras magnificum* (Billings).**

*Gyroceras* (*Lituities*) *magnificum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 307.

*Lituities?* *magnificum* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 23 (loc. ref.).

*Apsidoceras magnificum* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 289.

Richmond (English Head and Charleton): Southwest End Lighthouse, Anticosti.

***Arabellites* Hinde.**

Genotype: *A. hamatus* Hinde.

*Arabellites* Hinde, Quart. Jour. Geol. Soc. London, 25, 1879, p. 377.—Miller, N. A. Geol. Pal., 1889, p. 517.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 240.

***Arabellites aciculatus* James.**

*Arabellites aciculatus* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 148, pl. 7, fig. E.

Maysville (Fairmount): Near Loveland, Ohio.

***Arabellites ascalis* Hinde.**

*Arabellites ascalis* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 21,

Cincinnati (Pulaski): Toronto, Ontario.

***Arabellites cervicornis* Hinde.**

*Arabellites cervicornis* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, figs. 8, 12.

Cincinnati (Pulaski): Toronto, Ontario.

***Arabellites cornutus* Hinde.**

*Arabellites cornutus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 377, pl. 18, figs. 13-15.

Cincinnati (Pulaski): Toronto, Ontario.

***Arabellites crenulatus* Hinde.**

*Arabellites crenulatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 9.

Cincinnati (Pulaski): Toronto, Ontario.

***Arabellites cristatus* Hinde.**

*Arabellites cristatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 19, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1528g.

*Eunicites cristatus* Miller, N. A. Geol. Pal., 1889, p. 518 (gen. ref.).

Cincinnati (Pulaski): Toronto, Ontario.

***Arabellites cuspidatus* Hinde.**

*Arabellites cuspidatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 19.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1527a.

Cincinnati (Pulaski): Toronto, Ontario.

***Arabellites elegans* Hinde.**

*Arabellites elegans* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 382, pl. 20, figs. 5, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1529b.

Upper Medinan (Cataract): Toronto, Ontario.

**Arabellites gibbosus** Hinde.

*Arabellites gibbosus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1527c.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites hamatus** Hinde.

*Arabellites hamatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 377, pl. 18, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 240, fig. 1526d.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites hindei** James.

*Arabellites hindei* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 149, pl. 7, fig. D.

Maysville (Fairmount): Near Loveland, Ohio.

**Arabellites lunatus** Hinde.

*Arabellites lunatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 19, fig. 4-6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1528d.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites? obliquus** Hinde.

*Arabellites? obliquus* Hinde, Quart. Jour. Geol. Soc. London, 1879, p. 379, pl. 19, fig. 15.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites ovalis** Hinde.

*Arabellites ovalis* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 16.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites pectinatus** Hinde.

*Arabellites pectinatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 11.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites procursus** Foerste.

*Arabellites procursus* Foerste, Amer. Geologist, 2, 1888, p. 417, fig. 3; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 3.

Richmond (Elkhorn): Todds Fork, near Wilmington, Ohio.

**Arabellites quadratus** Hinde.

*Arabellites quadratus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 14.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites rectus** Hinde.

*Arabellites rectus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 18.

Cincinnatian (Pulaski): Toronto, Ontario.

**Arabellites scutellatus** Hinde.

*Arabellites scutellatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 16.

Cincinnatian (Pulaski): Toronto, Ontario.



**Arabellites similis** Hinde.

*Arabellites similis* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 382, pl. 20, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1529d.

Upper Medinan (Cataract): Toronto, Ontario.

**ARACHNOCRINUS PISIFORMIS** Meek and Worthen. See *Lecanocrinus pisiformis*.

**ARACHNOPHYLLUM** Dana. See *Strombodes* Schweigger.

**ARCA** Linnæus. Not a Paleozoic genus.

**Arca?? browni** Salter.

*Arca? Brownii* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 69, pl. 4, figs. 19, 20.

Silurian: West slope of Mt. Illampu, Bolivia.

**Arca?? gracilis** Hoek.

*Arca gracilis* Hoek, Neues Jahrb., Min., Geol., Pal., 34, 1912, pl. 8, fig. 17.

Ordovician: Totoropampa, Bolivia.

**ARCA POSTSTRIATA** D'Orbigny. See *Lyrodesma poststriatum*.

**ARCHÆOCRINUS** Wachsmuth and Springer.

Genotype: *Glyptocrinus lacunosus* Billings.

*Archæocrinus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 363 (Rev. Pal., pt. 2, p. 189); *ibid.*, 1885, p. 318; *ibid.*, 1890, p. 366.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 217.—Carpenter, Phil. Trans. Roy. Soc. London, 174, 1884, pp. 929, 930.—Miller, N. A. Geol. Pal., 1889, p. 225.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 253.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 200, fig. 125.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 145.—Weller, Bull. Chicago Acad. Nat. Hist. Surv., 4, pt. 1, 1900, p. 88, fig. 41.—Zittel, Grundzuge Pal., 1, 1910, p. 161.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 550.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 188.

**ARCHÆOCRINUS ASPERATUS** Wachsmuth and Springer. See *Deocrinus asperatus*.

**ARCHÆOCRINUS ASPERATUS** Miller and Gurley. See *Diabolocrinus asperatus*.

**Archæocrinus? deliculatus** Hudson.

*Archæocrinus? deliculatus* Hudson, Bull. New York State Mus., 107, 1907, p. 129, fig. 8.

Chazyan (Valcour): Valcour Island, Lake Champlain, New York.

**Archæocrinus depressus** Weller.

*Archæocrinus depressus* Weller, Bull. Chicago Acad. Sci. Nat. Hist. Surv., 4, pt. 1, 1900, p. 89, pl. 3, figs. 9-10.

Niagaran (Racine): Bridgeport, Cicero, and Hawthorne, Illinois.

**Archæocrinus desideratus** W. R. Billings.

*Archæocrinus desideratus* W. R. Billings, Trans. Ottawa Field Nat. Club, 2, 1885, p. 249, pl. fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 257, pl. 10, figs. 4a, b.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 200, fig. 125.

Trenton (Curdsville): Ottawa, Ontario.

**Archæocrinus knoxensis** Miller and Gurley.

*Archæocrinus knoxensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 34, pl. 3, fig. 12-15.

Chazyan (Ottosee): Knox County, Tennessee.

**Archæocrinus lacunosus** (Billings).

Glyptocrinus lacunosus Billings, Geol. Surv. Canada, Rep. Progress for 1853-1856, 1857, p. 261; Geol. Surv. Canada, dec. 4, 1859, p. 61, pl. 8, figs. 3a-3e.

Archæocrinus lacunosus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190); Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 255, pl. 10, fig. 1.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 11 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**Archæocrinus marginatus** (Billings).

Glyptocrinus marginatus Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 260; Geol. Surv. Canada, dec. 4, 1859, p. 59, pl. 9, fig. 1a.

Archæocrinus marginatus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190); Mem. Mus. Comp. Zool., Harvard, 20, 1897, pp. 254, 275, pl. 20, fig. 2

Trenton (Curdsville): Ottawa, Ontario.

**Archæocrinus microbasilis** (Billings).

Thysanocrinus (Rhodocrinus) microbasilis Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 264.

Rhodocrinus microbasilis Billings, Geol. Surv. Canada, dec. 4, 1859, p. 63, pl. 6, fig. 2.

Archæocrinus microbasilis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190); Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 256, pl. 10, fig. 2a-c.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 11 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**Archæocrinus parvus** Miller and Gurley.

Archæocrinus parvus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 21, pl. 2, figs. 26-28.—Miller, N. A. Geol. Pal., 1897, 2d App., p. 734, fig. 1298.

Chazy (Ottosee): Knox County, Tennessee.

**Archæocrinus peculiaris** Miller and Gurley.

Archæocrinus peculiaris Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 17, pl. 2, figs. 1-3.—Miller, N. A. Geol. Pal., 1897, 2d App., p. 734, figs. 1299-1300.

Chazy (Ottosee): Knox County, Tennessee.

**Archæocrinus pyriformis** (Billings).

Thysanocrinus (Rhodocrinus) pyriformis Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 262.

Rhodocrinus pyriformis Billings, Geol. Surv. Canada, dec. 4, 1859, p. 61, pl. 6, figs. 1a-d.

Archæocrinus pyriformis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190) (gen. ref.); Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 255, pl. 10, fig. 3a, b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 550.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 11.

Trenton (Curdsville): Ottawa, Montreal, and Kirkfield, Canada.

ARCHÆOCRINUS? RAMULOSUS Wachsmuth and Springer. See Glyptocrinus ramulosus.

ARCHÆOCRINUS SCULPTUS Wachsmuth and Springer. See Diabolocrinus vespertalis.

ARCHÆOCYATHUS MINGANENSIS Billings. See Archæoscyphia minganensis.



- ARCHÆOSCYPHIA** Hinde. Genotype: *Archæocyathus minganensis* Billings.  
*Archæocyathus* (part) Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 354.  
*Archæoscyphia* Hinde, Quart. Jour. Geol. Soc. London, 45, 1894, p. 142.—Rauff, Palæontographica, 40, 1894, p. 238.

***Archæoscyphia minganensis* (Billings).**

- Petraia minganensis* Billings, Canadian Nat. Geol., 4, 1859, p. 346.  
*Archæocyathus Minganensis* Billings, New sp. L. Sil. Foss., 1861, p. 5; Pal. Foss. 1, Geol. Surv. Canada, 1865, p. 354, figs. 342a, b, 343a, 344; Geol. Vermont, 2, 1861, p. 945; Rep. Econ. Geol., etc., Vermont, 1862, p. 217.—Nicholson, Man. Pal., 1872, p. 68, fig. 15.—Dawson, Life's Dawn on Earth, 1875, p. 152, fig. 38.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 2, fig. 2a; Ibid., 1880, p. 299, pl. 2, figs. 2a, b.—Zittel, Handb. Pal., 1, 1880, pp. 173, 728.—Hinde, Quart. Jour. Geol. Soc., London, 40, 1884, p. 835; Geol. Mag., dec. 3, 5, 1888, p. 226, 227, fig. 1.  
*Archæoscyphia minganensis* Hinde, Quart. Jour. Geol. Soc. London, 45, 1889, p. 143, pl. 5, figs. 12–14; Canadian Rec. Sci., 3, 1889, p. 373.—Rauff, Palæontographica, 40, 1894, p. 240, pl. 1, figs. 1–10.  
*Ethmophyllum minganense* Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 77, fig. 6–8.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, pp. xxii, 225, figs. Canadian (Romaine): Mingan Islands, Canada.

- ARCHINACELLA** Ulrich and Scofield. Genotype: *A. powersi* Ulrich and Scofield.  
*Metoptoma* Billings (part), Geol. Surv. Canada, Pal. Fossils, 1, 1865, p. 39.  
*Tryblidium* Whiteaves (part), Geol. Surv. Canada, Pal. Fossils, 3, 1884, p. 31.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1 and 2, 1886–9.  
*Archinacella* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 821–828.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 605.—Berkey, Amer. Geol., 21, 1898, p. 278.

***Archinacella? billingsi* (Walcott).**

- Metoptoma Billingsi* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 212, pl. 17, figs. 12, 12a.  
 Black River (Lowville): Russia, Herkimer County, New York.

***Archinacella canadensis* (Whiteaves).**

- Tryblidium Canadense* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 31, pl. 5, figs. 1, 1a.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1234, text figs.  
*Capulus Canadensis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 69, pl. 11, fig. 1.  
*Archinacella canadensis* Ulrich and Scofield Geol. Minnesota, 3, pt. 2, 1897, p. 825 (gen. ref.).  
 Niagaran (Guelph): Hespeler, Ontario.

***Archinacella cingulata* Ulrich.**

- Archinacella cingulata* Ulrich Geol. Minnesota, 3, pt. 2, 1897, p. 829, pl. 61, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 606, fig. 805 g, h.  
*Triblidium cingulatum* Miller, N. A. Geol. Pal., 2d App., 1897, p. 771 (gen. ref.).  
 Trenton (Curdsville): Mercer County, Kentucky.  
*Holotype*.—Cat. No. 45686, U.S.N.M.

***Archinacella clochensis* Foerste.**

- Archinacella clochensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 308, pl. 2, figs. 5a–b.  
 Black River (Lowville): La Cloche Peninsula, Ontario.

**Archinacella deformata** (Hall).

- Orbicula? *deformata* Hall, Pal. New York, 1, 1847, p. 23, pl. 4, figs. 10a, 10b.  
(*Orbicula deformis* in explanation of plate.)
- Crania? *deformata* Miller, N. A. Geol. Pal., 1889, p. 341.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 150.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 189.
- Archinacella? deformata* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 375; Ann. Carnegie Mus., 4, 1908, p. 171, pl. 46, figs. 1–6.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 605, fig. 806.
- Metoptoma deformis* Billings, Geology Canada, 1863, p. 937.
- Discina deformis* Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 1, fig. 10.
- Stenothea dubia* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, 1898, p. 58.
- Metoptoma dubia* Hall, Pal. New York, 1, 1847, p. 23, pl. 4, figs. 11a, 11b.
- Chazy (Day Point-Valcour): Crown Point, Valcour Island and Chazy, New York; Aylmer, Canada.

**Archinacella deleta** (Sardeson).

- Carinaropsis deleta* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 335, pl. 6, figs. 5, 6.
- Archinacella deleta* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 831, pl. 61, figs. 16–20.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 606, fig. 805c–e.
- Black River (Decorah): Minneapolis, St. Paul, Cannon Falls, etc., Minnesota.
- Plesiotype*.—Cat. No. 45687, U.S.N.M.

**Archinacella depressa** Ulrich and Scofield.

- Archinacella depressa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 830, pl. 61, figs. 8 and 9.
- Black River (Platteville): Minneapolis, Minnesota.
- Plastotype*.—Cat. No. 45688, U.S.N.M.

**Archinacella estella** (Billings).

- Metoptoma estella* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 153, fig. 134a, b (advance sheets, 1862); Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 18 (loc. ref.).
- Tryblidium? estella*, Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1894, p. 31 (gen. ref.).
- Archinacella estella* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).
- Richmond (English Head): English Head, Anticosti.

**Archinacella indianensis** (Miller).

- Tryblidium indianense* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 695, pl. 14, fig. 14 (adv. sheets, 1891, p. 85).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 977, pl. 39, fig. 11.
- Richmond: Fayette County, Indiana.
- Observation.—Compare *Archinacella richmondensis* Ulrich.

**Archinacella instabilis** (Billings).

- Metoptoma instabilis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 251, fig. 236a, b.
- Tryblidium? instabilis* Whiteaves, Pal. Fossils, Geol. Surv. Canada, 3, pt. 1, 1884, p. 31 (gen. ref.).
- Archinacella instabilis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).
- Chazy (Quebec L): Table Head, Newfoundland.



***Archinacella instabilis incurva* Ulrich and Scofield.**

*Archinacella instabilis* var. *incurva* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 835, pl. 61, figs. 21-23.

Black River (Decorah): Goodhue County, Minnesota.

*Holotype*.—Cat. No. 45689, U.S.N.M.

***Archinacella orbiculata* (Hall).**

*Carinaropsis orbiculatus* Hall, Pal. New York, 1, 1847, p. 306, pl. 83, figs. 8a-c.  
*Helcion orbiculatus* D'Orbigny, Prodr. Pal., 1, 1849, p. 9 (gen. ref.).—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 164.

*Archinacella orbiculata* Ruedemann, Bull. New York State Mus., 162, 1912, p. 108, pl. 7, figs. 1-6.

Trenton (Snake Hill): Snake Hill, Waterford, etc., New York.

***Archinacella patelliformis* (Hall).**

*Carinaropsis patelliformis* Hall, Pal. New York, 1, 1847, p. 183, pl. 40, figs. 2a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 314; N. A. Geol. Pal., 1889, p. 400, fig. 659.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 117, figs.

*Helcion patelliformis* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 164, pl. 6, fig. 1.—D'Orbigny, Prodr. Pal., 1, 1849, p. 9 (gen. ref.).

*Archinacella patelliformis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 832 (gen. ref.).—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 174, pl. 12, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 606.

Black River-Maysville: Middleville, etc., New York (Trenton); New Jersey; Ohio; Missouri, etc.

***Archinacella perovalis* (Whitfield).**

*Metoptoma perovalis* Whitfield, Ann. Rep. Geol. Surv. Wisconsin, 1878, p. 74; Geol. Wisconsin, 4, 1882, p. 211, pl. 5, figs. 13 and 14.

*Archinacella perovalis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 830, pl. 82, figs. 3 and 4.

*Metoptoma explanata* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 337, pl. 6, figs. 7, 8.

Black River (Platteville): Minneapolis, Minnesota; Beloit, Wisconsin.

***Archinacella phillipsi* (Walcott).**

*Metoptoma phillipsi* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 83, pl. 1, figs. 4, 4a.

*Archinacella phillipsi* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.)

Upper Pogonip: Pogonip Ridge, Eureka District, Nevada.

*Cotypes*.—Cat. No. 17359, U.S.N.M.

***Archinacella pileolum* (Whitfield).**

*Triblidium pileolum* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 46, pl. 7, figs. 15-17.

*Tryblidium pileolum* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1236, figs.

*Archinacella pileolum* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 826 (gen. ref.).

Canadian (Beekmantown): Beekmantown, New York.

***Archinacella powersi* Ulrich and Scofield.**

*Archinacella powersi* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829, pl. 61, figs. 3-5, p. 820, fig. 1a.

**Archinacella powersi**—Continued.

*Triblidium powersi* Miller, N. A. Geol. Pal., 2d App., 1897, p. 771 (gen. ref.)

Black River (Platteville): Beloit, Wisconsin.

*Plastotype*.—Cat. No. 45690, U.S.N.M.

**Archinacella? propria** Raymond.

*Metoptoma montrealensis* Raymond (not Billings), Bull. Amer. Pal., 14, 1902, p. 34.

*Archinacella? propria* Raymond, Ann. Carnegie Mus., 3, 1906, p. 575; 4, 1908, p. 172, pl. 46, figs. 7, 8.

Chazy (Day Point, Crown Point): Crown Point, Valcour Island, and Chazy, New York.

**Archinacella pulaskiensis** Foerste.

*Carinaropsis patelliformis* Hull (part), Pal. New York, 1, 1847, p. 306, pl. 83, figs. 7a, b.

*Archinacella pulaskiensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 309, pl. 3, fig. 3a-d.

Cincinnati (Pulaski): Pulaski, Lorraine, etc., New York.

**Archinacella richmondensis** Ulrich.

*Archinacella richmondensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 834, pl. 61, figs. 6, 7.

Richmond (Whitewater): Richmond, Indiana.

*Holotype*.—Cat. No. 45691, U.S.N.M.

Observation.—Compare *Archinacella indianensis* (Miller).

**Archinacella rotunda** Ulrich and Scofield.

*Archinacella rotunda* Ulrich and Schofield, Geol. Minnesota, 3, pt. 2, 1897, p. 835, pl. 61, figs. 24, 25.

*Triblidium rotundum* Miller, N. A. Geol. Pal., 2d App., 1897, p. 771 (gen. ref.).

Richmond (Maquoketa): Near Graf, Iowa.

*Holotype*.—Cat. No. 45692, U.S.N.M.

**Archinacella rugatina** Ulrich.

*Archinacella rugatina* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 835, pl. 82, figs. 5, 6.

Richmond (Arnheim): Middletown, Ohio.

*Holotype*.—Cat. No. 43693, U.S.N.M.

**Archinacella semicarinata** Ulrich and Scofield.

*Archinacella semicarinata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 833, pl. 61, figs. 12, 13.

Trenton (Prosser): Cannon Falls, Goodhue County, Minnesota.

*Holotype*.—Cat. No. 43694, U.S.N.M.

**Archinacella similis** (Whitfield).

*Metoptoma similis* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 61; Geol. Wisconsin, 4, 1882, p. 196, pl. 3, figs. 12, 13.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 142, fig.

*Tryblidium simile* Sardeson, Jour. Geol., 11, 1903, p. 479, fig. 3.

*Archinacella similis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).

Ozarkian (Mendota): East of Baraboo, Wisconsin.

**Archinacella simplex** (Billings).

*Metoptoma simplex* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 346, fig. 334.



**Archinacella simplex**—Continued.

*Tryblidium simplex* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 31 (gen. ref.).—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 306, pl. 24, figs. 30, 31.—Seely, Rep. Vermont State Geol., 7, 1910, pl. 62, figs. 30, 31.

*Archinacella simplex* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 826 (gen. ref.).

Canadian (Beekmantown): Near Merrickville, Ontario.

**Archinacella simulatrix** Ulrich and Scofield.

*Archinacella simulatrix* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 833, pl. 61, figs. 10, 11.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 606, fig. 805f, i.

Black River (Decorah): St. Paul, Minnesota.

Trenton (Hermitage): Frankfort, Kentucky.

*Holotype*.—Cat. No. 45695, U.S.N.M.

**Archinacella subrotunda** Ulrich and Scofield.

*Archinacella subrotunda* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 834, pl. 61, figs. 26, 27.

Black River (Decorah): Near Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 45696, U.S.N.M.

**Archinacella trentonensis** (Billings).

*Metoptoma trentonensis* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 40, fig. 41a, b (adv. sheets, 1862).

*Tryblidium?* *trentonensis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 31 (gen. ref.).

*Archinacella trentonensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).

Trenton: Chevrotiere and Island of Montreal, Canada.

**Archinacella valida** (Sardeson).

*Tryblidium validum* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 337, pl. 6, figs. 1, 2.

*Archinacella valida* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 832, pl. 61, figs. 14, 15.

Trenton (Prosser): Near Cannon Falls and Kenyon, Minnesota.

**ARCTINURUS** Castelnau.

Genotype: *Paradoxides boltoni* Bigsby.

*Arctinurus* Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 21.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 60, 63, 73.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 307.

*Oncholichas* Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, pp. 31, 39.—Koken, Die Leitfossilien, Leipzig, 1896, p. 30.

*Platynotus* Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 60, 62.

*Pterolichas* Gurich, Neues Jahrb. f. Minn., Geol. Pal., Beilage-Band, 14, 1901, p. 528, pl. 20, fig. 2.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 62, 73.

**Arctinurus boltoni** (Bigsby).

*Paradoxides boltoni* Bigsby, Jour. Acad. Nat. Sci. Philadelphia, 1st ser., 4, pt. 2, 1825, p. 365, pl. 23.—Green, Mon. Tril. N. A., 1832, p. 60, pl. 1, fig. 5.—Harlan, Trans. Geol. Soc. Pennsylvania, pt. 1, 1834, p. 103.

*Arctinurus boltoni* Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 21, pl. 3, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 307, fig. 1618.

**Arctinurus boltoni**—Continued.

- Platynotus boltoni Conrad, Rep. New York State Geol. Surv., 1838, p. 118.—Hall, Geol. New York, pt. 4, Tab. Org. Rem., 1843, p. 19, fig. 1.
- Lichas boltoni Hall, Pal. New York, 2, 1852, p. 311, pl. 69; pl. 70, figs. 1a-g, j-l (not figs. 1h-i).—Gebhard, 8th Rep. New York State Cab. Nat. Hist., 1855, p. 29, pl. 69, fig. 1.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 508, pl. 25, fig. 5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 336, fig.—Clarke, 10th Rep. State Geol. New York, 1891, p. 88; 44th Rep. New York State Mus., 1892, p. 112.—Keyes, Missouri Geol. Surv., 4, 1894, p. 226.—Grabau, Bull. New York State Mus., 45, 1901, p. 225, pl. 17.
- Lichas (Oncholichas) Boltoni Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, p. 31.
- Pterolichas boltoni Gurich, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 14, 1901, p. 528, pl. 20, fig. 2.
- Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby, Hamilton, etc., Ontario.
- Plastotype*.—Cat. No. 4888, U.S.N.M.

**Arctinurus chicagoensis** Weller.

- Arctinurus chicagoensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 248, pl. 23, figs. 7, 8; pl. 22, fig. 14.
- Niagaran (Racine): Hawthorne, Illinois.

**Arctinurus harrisi** (Miller).

- Lichas harrisi Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 106, pl. 3, fig. 9.
- Lichas (Platynotus) harrisi Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.
- Richmond (Liberty): Near Waynesville, Ohio.
- Holotype*.—Cat. No. 40690, U.S.N.M.

**Arctinurus nereus** (Hall).

- Lichas boltoni Hall, Pal. New York, 2, 1852, p. 311, pl. 70, figs. 1h-i (not figs. 1a-g, j-l).
- Lichas nereus Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 226.—Van Ingen, School of Mines Quart., 23, 1901, p. 64, pl. figs. 14-26.
- Arctinurus nereus Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308.
- Niagaran: Lockport, New York (Rochester); St. Clair Springs, Independence County, Arkansas (St. Clair).

**Arctinurus obivius** (Hall).

- Lichas obivius Hall, 20th Rep. New York State Cab. Nat. Hist., 1870 (rev. ed.), p. 424, pl. 25, fig. 10.
- Lichas (Oncholichas) obvia Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, p. 31.
- Niagaran: Lyons, Iowa.

**Arctinurus occidentalis** (Hall).

- Lichas boltoni Worthen and Meek, Geol. Surv. Illinois, 6, 1875, p. 508, pl. 25, fig. 5.
- Lichas boltoni var. occidentalis Hall, Trans. Albany Inst., 4, 1864, p. 223; 28th Rep. New York State Mus. Nat. Hist. (doc. ed.), 1877, pl. 34, figs. 8-11; (mus. ed.), 1879, p. 198, pl. 34, figs. 8-11; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 344, pl. 36, figs. 8-11, 12.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 335, fig.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 272.
- Arctinurus occidentalis Weller, Bull. Chicago Acad. Sci., Nat. Hist., Surv., 4, pt. 2, 1907, p. 247, pl. 20, figs. 10-12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308, fig. 1621a.



**Arethinurus occidentalis**—Continued.

Niagaran: Waldron, Indiana, and Newsom, Tennessee (Waldron); Grafton, Joliet, and Bonfield, Illinois; Cumberland Gap, Tennessee (Clinton).

**ARENICOLA** SALTER. See *Arenicolites* Salter.**ARENICOLITES** Salter.

Genotype: *Arenicola didyma* Salter.

*Arenicola* Salter (not Leach), Quart. Jour. Geol. Soc. London, 12, 1856, p. 248.

*Arenicolites* Salter, Quart. Jour. Geol. Soc. London, 13, 1857, p. 204.—Nathorst.

Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, p. 49.—Whitfield, Geol.

Wisconsin, 4, 1882, p. 177.—Miller, N. A. Geol. Pal., 1889, p. 517.

**ARENICOLITES (SCOLITHUS) LINEARIS.** See *Scolithus linearis*.**Arenicolites sparsus** Salter.

*Arenicolites sparsus* Salter, Quart. Jour. Geol. Soc. London, 13, 1857, p. 203.—

Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 138.—Nicholson,

Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 41, fig. 17.

Silurian: Europe; Dundas, Ontario (Cataract).

**ARETHUSINA** Barrande.

Genotype: *Arethusa koninckii* Barrande.

*Arethusa* Barrande, Notice Prel., Syst. Sil. Boheme, 1846, p. 48.

*Arethusina* Barrande, Neues Jahrb. f. Min., etc., 1850, p. 780; Syst. Sil. du Cen-

tre Boheme, 1, 1852, p. 493.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 498.—

Barrande, Neues Jahrb. f. Min., Geol. Pal., 1868, p. 257.—Ehlert, Bull. Soc.

d'Etudes Sci. d'Angers, 1885, p. 4.—Zittel, Handb. Pal., 2, 1885, p. 624.—

Beecher, Amer. Jour. Sci., 3d ser., 46, 1893, p. 143; Amer. Geol., 16, 1895,

pp. 167, 176.—Koken, Die Leitfossilien, Leipzig, 1896, p. 24.—Lindstrom,

Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 32.

**Arethusina americana** Walcott.

*Arethusina americana* Walcott, Mono. U. S. Geol. Surv., 8, 1884, p. 62, pl. 9,

fig. 27.—Brogger, Geol. Foren. Stockholm Forhandl., 8, 1886, p. 206.

*Harpides americanus* Frech, Leth. geog., Th. 1, Leth. Pal., 2, 1897, p. 44, footnote.

Cambrian and ?Ordovician (Pogonip): Eureka District, Nevada.

**Arethusina argentina** Kayser.

*Arethusina argentina* Kayser, Beitr. Geol. Pal. Argentinischen Republik, Palæontographica Suppl., 3, 1876, p. 12, pl. 2, fig. 2.

Ordovician: Quebrada de la Laja, Argentina.

**ARGASTER** Hall. See *Mesopalæaster* Schuchert.**ARGES ARKANSANA** Van Ingen. See *Dicranopeltis arkansana*.**ARGES PHLYCTAINODES** Hall. See *Corydocephalus phlyctainodes*.**ARGES PHLYCTAINODES DEPAUPERATUS** Van Ingen. See *Corydocephalus depauperatus*.**ARGES TUBERCULATUS** Weller. See *Corydocephalus tuberculatus*.**ARIONELLUS** Barrande.

Genotype: *A. ceticephalus* Barrande.

*Arionellus* Barrande, Neues Jahrb. f. Min., etc., 1850, p. 779; Syst. Sil. du Centre

Boheme, 1, 1852, p. 404, pl. 10.—Pictet, Traite de Pal., 2d ed., 1854, 2, p. 491.—

Billings, Canadian Nat. Geol., 5, 1860, p. 313; Pal. Foss., 1, Geol. Surv.

Canada, 1865, p. 405.—Kayser, Beit. Geol. Pal., Argentinischen Republik,

Palæontographica Suppl., 3, 1876, p. 7.—Walcott, Science, 3, 1884, p. 281.—

**ARIONELLUS**—Continued.

Zittel, Handb. Pal., 2, 1885, p. 601.—Koken, Die Leitfossilien, Leipzig, 1896, p. 21, fig. 13, figs. 5, 6.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, pp. 22, 25.

**Arionellus? cylindricus** Billings.

*Arionellus cylindricus* Billings, Canadian Nat. Geol., 5, 1860, p. 314, fig. 14; Geol. Canada, Geol. Surv. Canada, 1863, p. 237, fig. 264; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 406, fig. 385.

*Ptychaspis cylindricus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 198.

*Agraulos cylindricus* Miller, N. A. Geol. Pal., 1889, p. 527, fig. 955.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

**ARIONELLUS OWENI** Meek and Hayden. See *Ptychoparia oweni*.

**ARIONELLUS PUSTULATUS** Walcott. See *Glaphurus pustulatus*.

**Arionellus? subclavatus** Billings.

*Arionellus subclavatus* Billings, Canadian Nat. Geol., 5, p. 315, fig. 15; Geol. Canada, Geol. Surv. Canada, 1863, p. 237, fig. 265a, b; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 406, fig. 386a.

*Ptychaspis subclavatus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 198.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

**ARISTERELLA** Ulrich.

Genotype: *A. nitidula* Ulrich.

*Aristerella*, Ulrich Geol. Minnesota, 3, pt. 2, 1894, p. 524.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 779.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518.

**Aristerella nitidula** Ulrich.

*Aristerella nitidula* Ulrich Geol. Minnesota, 3, pt. 2, 1894, p. 524, pl. 35, figs. 30–39.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518, fig. 696c, d, e.

Black River: Chatfield, Minnesota (Decorah); Lincoln County, Missouri (Auburn). *Cotypes*.—Cat. No. 46092, 46093, U.S.N.M.

**Aristophycus** Miller and Dyer.

Genotype: *A. ramosum* Miller and Dyer.

*Aristophycus* Miller and Dyer, Contr. to Pal. No. 2, 1878, p. 3.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130.—Miller, N. A. Geol. Pal., 1889, p. 107.

Observation.—Genus and species abandoned by author in 1889, as probably inorganic and, if fucoïdal, too irregular and too little known to be retained.

**Aristophycus ramosum** Miller and Dyer.

*Aristophycus ramosum* Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 4, pl. 4, fig. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130, pl. 6, fig. 2; 14, 1891, p. 46.—Miller, N. A. Geol. Pal., 1, 1889, p. 107.

Maysville: Cincinnati, Ohio.

**Aristophycus ramosum germanum** Miller and Dyer.

*Aristophycus ramosum* var. *germanum* Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 4, pl. 4, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 130.—James, Jour. Cincinnati Soc. Nat. Hist., 1891, 14, p. 46.

Maysville: Cincinnati, Ohio.

**ARISTOZOE** Barrande.

Genotype: *A. bisulcata* Barrande.

*Aristozoe* Barrande, Syst. Sil. Boheme, Sup. 1, 1872, p. 474.—Canu, Ann. Soc. geol. du Nord, 12, 1885, p. 145.—Jones Rep. 53d Meeting Brit. Assoc. Adv. Sci., 1884, p. 217; 55th Meeting, 1886, p. 358.—Zittel, Handb. d. Pal., 2,



**ARISTOZOE**—Continued.

Munich, 1885, p. 552.—Novak, Sitz. d. k. bohm. Gesell. d. Wiss. Math.-Naturw. Cl., 1886, p. 239.—Jones and Woodward, Mon. Brit. Pal. Phyllopoda, Pal. Soc., 1888, p. 3.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1889, p. 42.—Miller, N. A. Geol. Pal., 1889, p. 530.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40.

**Aristozoe canadensis** Whitfield.

*Aristozoe canadensis* Whitfield, Ann. New York Acad. Sci., 1890, p. 505; 5, 1891, p. 572, pl. 12, figs. 17, 18; Geol. Surv. Ohio, Pal., 7, 1893, p. 462, pl. 8, figs. 17, 18.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 379, fig. 1680e, f.

Trenton: Ottawa Basin, Ontario.

**ARTHRRARIA** Billings.

Genotype: *A. antiquata* Billings.

*Arthraria* Billings, Canadian Nat., n. s., 6, 1872, p. 467; Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 66; Geol. Surv. Newfoundland, Rep. Progr. for 1881, 1882, App. p. 14.—Miller, N. A. Geol. Pal., 1889, p. 107.

**Arthraria biclavata** Miller.

*Arthraria biclavata* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 354, fig. 26. Maysville: Cincinnati, Ohio, and vicinity.

**ARTHROCLEMA** Billings.

Genotype: *A. pulchellum* Billings.

*Arthroclema* Billings, Pal. Foss., 1, 1865, p. 54 (adv. sheets, 1862).—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 151; 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 60; Amer. Geol., 1, 1888, p. 232.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 192; Geol. Surv. Illinois, 8, 1890, p. 400; Geol. Minnesota, 3, 1893, p. 197; Zittel's Textb. Pal., 1896, p. 281.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 546.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 5.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 42.—Cumings, Amer. Jour. Sci., 4th ser., 17, 1904, p. 75, fig. 83; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 739.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 150; Zittel-Eastman Textb. Pal., 1913, p. 343.

**Arthroclema angulare** Ulrich.

*Arthroclema angulare* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 45; Geol. Surv. Illinois, 8, 1890, p. 641, pl. 29, figs. 6-6b.—Whiteaves, Pal. Foss., 3, 1895, p. 117.

Richmond: Wilmington, Illinois (Fernvale); Stony Mountain, Manitoba (Stony Mountain); English Head, etc., Anticosti (English Head and Charleton).

**Arthroclema armatum** Ulrich.

*Arthroclema armatum* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 194, fig. 19a-d (not e-h); Geol. Minnesota, 3, 1893, p. 201, pl. 2, figs. 8-11, 25, 28-33, pl. 3, fig. 7.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, fig. 111.—Sardeson, Jour. Geol., 9, 1901, p. 161.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 153, fig. 2051.—Bassler, Bull. U. S. Nat. Mus. No. 77, 1911, pp. 151, 152, fig. 73.

Trenton (Prosser): Cannon Falls and St. Paul, Minnesota.

Ordovician (Glauconite limestone): Reval, Esthonia, Russia.

*Cotypes*.—Cat. No. 43633, U.S.N.M.

**ARTHROCLEMA ARMATUM** Ulrich (part). See *Arthroclema pulchellum*.

**Arthroclema billingsi** Ulrich.

*Arthroclema billingsi* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 642; Geol. Minnesota, 3, 1893, p. 197, pl. 2, fig. 7.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, fig. 105.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 153, fig. 205k.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 343, fig. 501a.

Trenton: Ottawa, Ontario.

*Holotype*.—Cat. No. 43415, U.S.N.M.

**Arthroclema cornutum** Ulrich.

*Arthroclema cornutum* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 193, fig. 18; Geol. Minnesota, 3, 1893, p. 200, pl. 2, figs. 16–21, 23, pl. 3, fig. 34.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, figs. 106–108, 112.

Black River (Decorah): Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 43634, U.S.N.M.

**Arthroclema pulchellum** Billings.

*Arthroclema pulchellum* Billings, Pal. Foss., 1, 1865, p. 54, fig. 60 (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 157, fig. 119.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 642, pl. 29, fig. 6c; Geol. Minnesota, 3, 1893, pl. 2, figs. 12–15.

*Arthroclema armatum* (part) Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 194, fig. 19e–h (not 19a–d).

Trenton: Ottawa, Ontario.

**ARTHROCLEMA SPINIFORME** Ulrich. See *Helopora spiniformis*.

**Arthroclema striatum** Ulrich.

*Arthroclema striatum* Ulrich, Geol. Minnesota, 3, 1893, p. 198, pl. 2, figs. 22, 24, pl. 3, figs. 28–33.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, figs. 109, 110.

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

*Cotypes*.—Cat. No. 43498, U.S.N.M.

**ARTHRONEMA** Ulrich. See *Arthrostylus* Ulrich.

**ARTHROPHYCUS** Hall.

Genotype: *Fucoides harlani* Conrad.

*Arthrophycus* Hall, Pal., New York, 2, 1852, p. 4.—Dawson, Canadian Nat. and Geol., n. s., 1, 1864, p. 366.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, pp. 32, 86.—James, Jour. Cincinnati Soc. Nat. Hist., 16, 1893, p. 82; Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 132; Bull. New York State Mus., 9, 1901, p. 132.—Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 247.

*Harlania* Goepfert, Zeits. d. d. Geol. Gesell., 3, 1851, p. 189.—Roemer, Leth. geog., 1 Theil, Leth. Pal., Erste Lief, 1880, p. 135.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 21, No. 14, 1886, p. 32.

**Arthrophycus alleghaniensis** (Harlan).

*Fucoides alleghaniensis* Harlan, Jour. Acad. Nat. Sci., 6, 1831, p. 289, pl. 15.—Taylor Trans. Geol. Soc. Pennsylvania, 1, 1834, p. 5.—Harlan, Medical and Physical Researches, 1835, p. 393, fig. 1 on plate.—Unger, Gen. et Sp. Foss. Plants, 1850, p. 30.

*Arthrophycus alleghaniensis* James, Jour. Cincinnati Soc. Nat. Hist., 16, 1893, p. 86.—Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 8, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 247.



**Arthropycus alleghaniensis**—Continued.

*Fucoides harlani* Conrad, 2d Ann. Rep. New York Geol. Surv., 1838, p. 113.—Vanuxem, Nat. Hist. New York, Geol. 3, 1842, p. 71, fig. 10.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 46, figs. 1, 2; tab. ill. 1, figs. 1, 2.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 299, figs. 1, 2.—Hall, Pal. New York, 2, 1852, p. 5, pl. 1, fig. 1; pl. 2, figs. 1a-c.

*Arthropycus harlani* Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 821, fig. 623.—Emmons, Manual Geol., 1860, p. 105, fig. 95.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 52, pl. 5, figs. 10, 11.—Chapman, Canadian Jour., n. s., 8, 1863, p. 209, fig. 211; Expos. Min. Geol. Canada, 1864, p. 181, fig. 211.—Whiteaves, Trans. Royal Soc. Canada, 1, sec. 4, 1883, p. 110.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1889, p. 37-39, figs.—James, Jour. Cincinnati Soc. Nat. Hist., 16, 1893, pp. 82-86; Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 3.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 132, pl. 16; Bull. New York State Mus., 45, 1901, p. 132, pl. 16.

*Crinosoma antiqua* Castelnau, Syst. Sil., 1843, p. 50, pl. 25, fig. 1.

*Encrinus giganteus* Eaton, Geol. Textbook, 2d ed., 1832, p. 37, pl. 1, fig. 8.

*Harlania Hallii* Goeppert, Nov. Act. Acad. Caes. Leop., 22, 1852, Suppl. (Uebergangsgeb., p. 98, pl. 41, fig. 4); Zeits. d. d. geol. Gesell., 3, 1852, pp. 189, 205; Saporta Le Monde des Plantes Appar. Homme, Paris, 1879, p. 164, figs. 1, 2.—Schimper, Pal. Veg., 1, 1869, p. 196, pl. 2, fig. 6.—Roemer, Leth. Geog., 1, Pal., 1880, p. 135, fig. 4.—Lesquereux, 13th Ann. Rep. Indiana Geol. Surv., 1883, p. 29, pl. 2, fig. 3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 272, fig.—James, Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Dana, Man. Geol., New York, 4th ed., 1895, p. 545, fig. 744.—Nathorst, Forh. Geol. Foren. Stockholm, 19, pt. 5, 1897, p. 364, pl. 5.

*Fucoides Brongniartii* Harlan, Featherstonhaugh's Monthly Amer. Jour. Geol., 1, 1832, p. 307.—Taylor, Trans. Geol. Soc. Pennsylvania, 1, 1834, p. 14, pl. 3, fig. 6.—Harlan, Medical, Physical Res., 1835, p. 398, pl. —, fig. 2.—Conrad 1st Ann. Rep. New York Geol. Surv., 1837, p. 168.

Top of White Medina (Tuscarora, Clinch, etc.): Mifflin County, etc., Pennsylvania; New York; Ontario; Maryland; Virginia.

**ARTHROPHYCUS HARLANI** Rogers. See *Arthropycus alleghaniensis*.

**ARTHROPORA** Ulrich.

Genotype: *Ptilodictya* (*Stictopora*) *shafferi* Meek.

*Arthropora* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 152, 167.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 393; Geol. Minnesota, 3, 1893, p. 176; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 279.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, pt. 2, p. 14.—Simpson, 14th Ann. Rep. State Geologist New York for the year 1894, 1897, p. 605.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 46.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 739.—Bassler, Bull. U. S. Nat. Mus., No. 77, 1911, p. 119; Zittel-Eastman Textb. Pal., 1913, p. 345.

**Arthropora bifurcata** Ulrich.

*Arthropora bifurcata* Ulrich, Geol. Minnesota, 3, 1893, p. 178, pl. 14, figs. 22-25.

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

Trenton: Minnesota, Kentucky, Tennessee, and Canada.

*Cotypes*.—Cat. No. 43504, U.S.N.M.

**Arthropora cincinnatiensis** (James).

*Ptilodictya?* *cincinnatiensis* James, Paleontologist, No. 5, 1881, p. 39.

*Arthropora cincinnatiensis* Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 14, pl. 4, fig. 7.

Maysville (Mount Hope): Cincinnati, Ohio, and vicinity.

**Arthropora cleavelandi** (James).

*Ptilodictya cleavelandi* James, *Paleontologist*, No. 5, 1881, p. 38.

*Ptilodictya grahami* James, *Paleontologist*, No. 5, 1881, p. 39.

*Ptilodictya dubia* James, *Paleontologist*, No. 5, 1881, p. 40.

*Arthropora shafferi-cleavelandi* Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 171.

*Arthropora cleavelandi* Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 14, pl. 3, figs. 13-16; pl. 4, fig. 6.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 766, pl. 26, fig. 10.

Eden: Cincinnati, Ohio, and vicinity.

**Arthropora kentuckiensis** (James).

*Ptilodictya kentuckyensis* James, *Paleontologist*, No. 5, 1881, p. 38.

*Arthropora kentuckiensis* Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 15, pl. 4, fig. 5.

Trenton (Upper): Ohio River bank opposite Cincinnati, Ohio.

**Arthropora reversa** Ulrich.

*Arthropora reversa* Ulrich, *Geol. Minnesota*, 3, 1893, p. 178, pl. 14, fig. 26.

Trenton (Prosser): St. Paul, Minnesota.

*Holotype*.—Cat. No. 43502 U.S.N.M.

**Arthropora shafferi** (Meek).

*Ptilodictya* (*Stictopora*) *Shafferi* Meek, *Proc. Acad. Nat. Sci. Philadelphia*, 1872, p. 317; *Pal. Ohio*, 1, 1873, p. 69, pl. 5, figs. 1a-c.

*Ptilodictya shafferi* Nicholson, *Pal. Prov. Ontario*, 1875, p. 33, fig. 4.

*Stictopora shafferi* Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1890, p. 1069, figs.

*Arthropora shafferi* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 167, pl. 7, figs. 10, 10a.—Miller, *N. A. Geol. Pal.*, 1889, p. 293, figs. 453-455.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 308, fig. 3e.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 157.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 171.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 767, pl. 26, fig. 9.

*Crateripora erecta* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1879, p. 29, pl. 7, figs. 29, 29a; 5, 1882, p. 151.

*Stromatopora* (?) *lichenoides* James, *Paleontologist*, No. 3, 1879, p. 18; *Jour. Cincinnati Soc. Nat. Hist.*, 9, 1886, p. 251; 15, 1892, pt. 3, p. 90.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 56.

Maysville (Bellevue, Corryville): Cincinnati, Ohio, and many localities in Ohio, Indiana, Kentucky, and Tennessee.

*Plesiotypes*.—Cat. Nos. 43630, 43646 U.S.N.M.

**ARTHROPORA SHAFFERI-CLEAVELANDI** Nickles and Bassler. See *Arthropora cleavelandi*.

**Arthropora simplex** Ulrich.

*Arthropora simplex* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 65; *Geol. Minnesota*, 3, 1893, p. 177, pl. 14, figs. 12-21.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 157, fig. 208g.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, p. 120, 121, fig. 16.

Black River (Decorah): Minneapolis, St. Paul, etc., Minnesota; Decorah, Iowa, Ordovician (Wassaleum): Uxnorn, Esthonia, Russia.

*Cotypes*.—Cat. No. 43503, U.S.N.M.

**ARTHRORHACHIS** Hawle and Corda.

Genotype: *Battus tardus* Barrande.

*Arthrorhachis* Hawle and Corda, *Abh. d. k. bohmischen Gesell. d. Wiss.*, 5 (extract), 1847, p. 114, pl. 6, fig. 60.—Raymond, *Ottawa Naturalist*, 26, 1913, p. 3.



**Arthrorhachis galba** (Billings).

- Agnostus Galba Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 297, fig. 288.—Vogdes, Amer. Geol., 9, 1892, p. 395, pl. 9, fig. 6.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, p. 111, figs. 10, 2-5.
- Chazyan: Table Head, Pistolet Bay, and four miles northeast of Portland Creek, Newfoundland (Quebec—M, N, P); Lexington, Virginia (Liberty Hall).

**ARTHROSTYLUS** Ulrich.Genotype: *Helopora tenuis* James.

- Arthronema (preoccupied) Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 151, 160; Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 14.
- Arthrostylus Ulrich, American Geologist, 1, 1888, p. 230.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 188; Geol. Surv. Illinois, 8, 1890, p. 400; Geol. Minnesota, 3, 1893, p. 187; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 280.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 527.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 42.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 740.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 147; Zittel-Eastman Textb. Pal., 1913, p. 342.

**Arthrostylus conjunctus** Ulrich.

- Arthrostylus conjunctus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 189, fig. 14; Geol. Minnesota, 3, 1893, p. 188, pl. 3, figs. 13, 14.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 526, figs. 78, 79, 79a.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 147, 148, fig. 70; Zittel-Eastman Textb. Pal., 1913, p. 343, fig. 501d, e.
- Black River (Decorah): Near Fountain, Minnesota.
- Ordovician (Wassalein): Uxnorn, Esthonia, Russia.
- Holotype*.—Cat. No. 43636, U.S.N.M.

**Arthrostylus curtus** (Ulrich).

- Arthronema curtum Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 161, pl. 6, fig. 9.
- Arthrostylus curtus Miller, N. A. Geol. Pal., 1889, p. 293.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 171.
- Maysville (Mount Hope): Covington, Kentucky.
- Holotype*.—Cat. No. 43639, U.S.N.M.
- Observation.—Probably the basal segment of some species of Arthropora.

**Arthrostylus obliquus** Ulrich.

- Arthrostylus obliquus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 190, figs. 14c, d; Geol. Minnesota, 3, 1893, p. 188, pl. 3, figs. 15, 16.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152, fig. 205i.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 148, fig. 71.
- Black River (Decorah): Minneapolis, Minnesota.
- Ordovician (Echinospherites limestone): Wolchow River, St. Petersburg, Russia.
- Holotype*.—Cat. No. 43639, U.S.N.M.

**Arthrostylus tenuis** (James).

- Helopora tenuis* James, Paleontologist, No. 1, 1878, p. 3.
- Arthronema tenuis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 160, pl. 6, figs. 8-8c.
- Arthrostylus tenuis Ulrich, Geol. Minnesota, 3, 1893, pl. 3, fig. 16e; Jour. Cincinnati Soc. Nat. Hist., 12, 1890, pp. 189, 190, figs. 14e, f.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 768, pl. 26, figs. 8-8c.

**Arthrostylus tenuis**—Continued.

Trenton (Upper) and Eden: Cincinnati, Ohio, and vicinity; Indiana and Kentucky; New York (Indian Ladder).

*Plesiotypes*.—Cat. No. 43637, U.S.N.M.

**ASAPHELLUS** Callaway.

Genotype: *Asaphus homfrayi* Salter.

*Asaphellus* Callaway, Quart. Jour. Geol. Soc. London, 33, 1877, p. 663.—Zittel, Handb. Pal., 2, 1885, p. 609.—Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 37; Zittel-Eastman Textb. Pal., 1913, p. 719.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 290.

**Asaphellus gyracanthus** Raymond.

*Asaphus canalis*? Cleland, Bull. Amer. Pal., 3, 1900, p. 128, pl. 16, figs. 7, 8; 4, 1903, p. 38.

*Isotelus canalis* Weller, Pal. New Jersey, 3, 1902, p. 132, pl. 5, figs. 5, 6.

*Asaphellus gyracanthus* Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 39, pl. 14, figs. 5-7.

Canadian (Beekmantown): Fort Hunter, New York (Tribes Hill), and Columbia, New Jersey.

**Asaphellus homfrayi** (Salter).

*Asaphus Homfrayi* Salter, App. Ramsay Geol. N. Wales; Mem. Geol. Surv., 3, 1866, p. 311, pl. 8, figs. 11-14; Mem. Geol. Surv. Great Britain, 3, 1881, 2d ed., p. 506, pl. 8, figs. 11-14.

*Asaphus* (*Isotelus*) *Homfrayi* Salter, Mon. British Tril., Pal. Soc., 1866, p. 165, pl. 24, figs. 6-12; Cat. Camb. and Sil. Foss., 1873, p. 17.

*Asaphus* (*Asaphellus*) *Homfrayi* Callaway, Quart. Jour. Geol. Soc. London, 33, 1877, p. 663, pl. 24, fig. 1.

*Asaphellus Homfrayi* var. *Matthew*, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 413, pl. 18, figs. 10a-e; Rep. Cambrian Rocks Cape Breton, Geol. Surv. Canada, 1903, p. 232, pl. 18, figs. 10a-e.

*Asaphellus Homfrayi*, var. *macropyga* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 290, fig. 1598.

Lower Ordovician: Europe; McLeod Brook, near Boisdale, Cape Breton, Nova Scotia (Bretonian—Div. C 3c2).

**ASAPHELLUS PLANUS** Matthews. See *Hemigyaspis plana*.

**ASAPHOCRINUS** Springer.

Genotype: *A. bassleri* Springer.

*Asaphocrinus* Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

**Asaphocrinus bassleri** Springer.

*Asaphocrinus bassleri* Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Niagaran (Brownsport): Decatur County, Tennessee.

**Asaphocrinus incisus** (Ringueberg).

*Lecanocrinus incisus* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, No. 1, 1886, p. 10, pl. 1, fig. 6.

*Asaphocrinus incisus* Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Clinton (Rochester): Lockport, New York.

**Asaphocrinus ornatus** (Hall).

*Cyathocrinus*? Hall, Nat. Hist. New York, Geol. 4th Dist., 2, 1843, p. 201, pl. 44, figs. 2a-m.

*Lecanocrinus ornatus* Hall, Pal. New York, 2, 1852, p. 201, pl. 44, figs. 2a-m.

*Asaphocrinus ornatus* Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

*Lecanocrinus nitidus* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, No. 1, 1886, p. 9, pl. 1, fig. 5.

*Lecanocrinus excavatus* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, No. 1, 1886, p. 11, pl. 1, fig. 7.

Clinton (Rochester): Lockport, New York.



**ASAPHOIDICHNUS** Miller.Genotype: *A. trifidus* Miller.

*Asaphoidichnus* Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, pp. 217, 218;  
N. A. Geol. Pal., 1889, p. 530.

**Asaphoidichnus dyeri** Miller.

*Asaphoidichnus dyeri* Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 219,  
pl. 13, fig. 1.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881,  
p. 48.

Eden (Economy): Cincinnati, Ohio.

**Asaphoidichnus trifidus** Miller.

*Asaphoidichnus trifidus* Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 218;  
N. A. Geol. Pal., 1889, p. 530, fig. 966.

Eden (Economy): Cincinnati, Ohio.

**ASAPHUS** Brongniart.Genotype: *Entomolithus paradoxus expansus* Linnaeus.

*Asaphus* Brongniart, Hist. Nat. Crust. Foss., 1822, p. 17.—DeKay, Annals Lyceum  
Nat. Hist., New York, 1, 1824, p. 175 footnote.—Dalman, Kongl. Vet.-Akad.  
Handl. for 1826, 1827, pp. 149, 235, 268.—Dalman-Engelhart, Die Palaeaden,  
Nurnberg, 1828, pp. 32, 41.—Eichwald, Zool. Specialis, pt. 2, Vilnae, 1830,  
p. 114.—Fischer de Waldheim, Oryctographie de Moscou, 1830-1837, p. 121.—  
Eaton, Geol. Textb., 2d ed., 1832, p. 31.—Green, Mon. Tril. N. A., 1832, pp.  
16, 43.—Murchison, Sil. Syst., 1839, p. 654.—Edwards, Hist. Nat. d. Crus-  
taces, 3, 1840, p. 305.—Burmeister, Org. der Tril., Berlin, 1843, p. 122.—  
Portlock, Rep. Geol. Londonderry, 1843, pp. 274, 292.—Goldfuss, Neues  
Jahrb. f. Min., etc., 1843, pp. 541, 560.—Emmrich, *ibid.*, 1845, p. 41.—  
Loven, Ofvers, Kongl. Vet.-Akad. Forhandl., 2, 1845, p. 50.—Burmeister,  
Org. Tril., London, 1846, pp. 105, 108.—Hawle and Corda, Abb. d. k. bohmis-  
chen Gesell. d. Wiss., 5 (extract), 1847, p. 68, pl. 4, fig. 38.—Salter, Mem.  
Geol. Surv. United Kingdom, dec. 2, 1849, pl. 5.—McCoy, Ann. Mag. Nat.  
Hist., ser. 2, 4, 1849, p. 399.—Barrande, Neues Jahrb. f. Min., etc., 1850, p.  
778; Syst. Sil. du. Centre Boheme, 1, 1852, p. 643.—Pictet, Traite de Pal.,  
2d ed., 2, 1854, p. 511.—McCoy, British Pal. Rocks and Foss., 1854, p. 169.—  
Nieszkowski, Archiv. für die Naturk. Liv.-Ehstund Kurl., 1st ser., 1, 1857,  
p. 545.—Chapman, Canadian Jour., n. s., 8, 1863, p. 28; Expos. Min. and Geol.  
Canada, 1864, p. 136.—Salter, Mem. Geol. Surv. United Kingdom, dec. 11,  
1864, pl. 3; Mon. Brit. Tril., Pal. Soc. 1866, p. 145.—Woodward, Canadian  
Nat., n. s., 6, 1871, p. 228.—Miller, Cincinnati Quart. Jour. Sci., 1874, pp.  
135, 136.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 51.—Novak,  
Sitz. d. k. boh. Gesell. d. Wiss. Math. Naturw. Cl. for 1884, 1885, p. 217.—  
Zittel, Handb. Pal., 2, Munich, 1885, p. 608.—Brogger, Bihang till K. Sven.  
Vet.-Akad. Handl., 11, No. 3, 1886, pp. 25, 26, 70; Afh. Sveriges Geol. Unders.,  
ser. C, 1886, p. 70.—Woodward, Quart. Jour. Geol. Soc. London, 44, 1888,  
p. 77.—Clarke, Jour. Morph., 2, 1888, pp. 254, 265.—Miller, N. A. Geol. Pal.,  
1889, p. 530; 1st App. 1892, p. 704.—Walcott, Geol. Mag., dec. 4, 1, 1894, p.  
247.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 701.—Koken, Die Leitfos-  
silien, Leipzig, 1896, p. 26, fig. 16, 1, 2.—Beecher, Amer. Jour. Sci., 4th ser.,  
3, 1897, p. 104, pl. 3, fig. 18.—Schmidt, Mem. l'Acad. Imp. Sci. St. Peters-  
burg, 8th ser., 6, 1898, pp. 11, 12; 12, 1901, p. 4.—Jaekel, Zeits. d. d. geol.  
Gesell., 53, 1901, p. 147.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34,  
No. 8, 1901, pp. 26, 37.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res.  
Indiana, 1908, p. 1051.—Grabau and Shimer, N. A. Index Fossils, 2, 1910,  
p. 290.—Raymond, Trans. and Proc. Roy. Soc. Canada, 5, 3d ser., sec. 4,  
1912, p. 114.

**ASAPHUS**—Continued.

*Cryptonymus* Eichwald, Obs. geog.-zool., etc., de Tril. (not 1840), 1825, p. 44; Zool. Specialis, pt. 2, Vilnae, 1830, p. 114.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 554.—Salter, Mon. Brit. Tril., Pal. Soc., 1866, p. 147, 160.—Vogdes, Mon. Genera Zethus, Cybele and *Cryptonymus*, 1878, p. 15.—Zittel, Handb. Pal., 2, Munich, 1885, p. 609.

*Hemicrypturus* Green, Mon. Tril. N. A. 1832, p. 20.—Burmeister, Org. der Tril., Berlin, 1843, p. 124; Org. Tril., 1846, p. 107.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5, 1847, p. 69, pl. 4, fig. 37.

Observation.—Few of the above references apply to *Asaphus* s. s., but all are included here for future research upon this and allied genera.

**ASAPHUS ALACER** Billings. See *Brachyaspis alacer*.

**ASAPHUS ALPHA** Raymond. See *Basilicus marginalis*.

**Asaphus? astragolotes** Green.

*Asaphus astragolotes* Green Supp. 1, Mon. Trilobites N. A., 1835, p. 11.

Ordovician: Grenville Canal, Canada.

*Plastotype*.—Cat. No. 25698, U.S.N.M.

**ASAPHUS BARRANDI** Hall. See *Ptychopyge barrandi*.

**ASAPHUS BETA** Raymond. See *Isotelus beta*.

**ASAPHUS BOLIVIENSIS** D'Orbigny. See *Megalaspis? boliviensis*.

**ASAPHUS CANADENSIS** Chapman. See *Ogygites canadensis*.

**ASAPHUS CANALIS** Whitfield. See *Isoteloides whitfieldi*.

**ASAPHUS CANALIS** Hall. See *Isotelus canalis*.

**ASAPHUS CANALIS** Cleland. See *Asaphellus gyracanthus*.

**Asaphus(?) caribouensis** Walcott.

*Asaphus Caribouensis* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 98, pl. 12, figs. 7, 7a, b.

Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.

*Cotype*.—Cat. No. 24652, U.S.N.M.

**ASAPHUS CAUDATUS** Green. See *Dalmanites limulus*.

**ASAPHUS CONVEXUS** Cleland. See *Symphysurus convexus*.

**ASAPHUS CORDIERI** Castelnau. See *Dalmanites, limulus*.

**ASAPHUS CORYCÆUS** Conrad. See *Proetus corycæus*.

**Asaphus? crypturus** Green.

*Asaphus crypturus* Green, Suppl. Mon. Trilobites North Amer., 1835, p. 18.

Silurian: Moose River, Nova Scotia.

*Plastotype*.—Cat. No. 4835, U.S.N.M.

**Asaphus(?) curiosus** Billings.

*Asaphus? Curiosus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 318, fig. 305.

*Asaphus? curiosa* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 98, pl. 12, fig. 15.

Canadian: Stanbridge, Quebec (Beekmantown); Eureka District, Nevada (Pogonip).

*Plesiotype*.—Cat. No. 24651, U.S.N.M.



ASAPHUS EDWARDSII Castelnau. See *Dalmanites limulurus*.

ASAPHUS EMORYI Hall. See *Onchometopus emoryi*.

ASAPHUS EXTANS Winchell. See *Proetus stonemani*.

ASAPHUS? EXTANS Hall. See *Bathyrurus extans*.

ASAPHUS GAMMA Raymond. See *Basilicus marginalis*.

ASAPHUS GIGAS Dalman. See *Isotelus gigas*.

ASAPHUS(?) GONIURUS Billings. See *Megalaspis goniurus*.

ASAPHUS HALLI Chapman. See *Ogygites canadensis*.

ASAPHUS HINCKSI Chapman. See *Ogygites canadensis*.

ASAPHUS HOMALONOTOIDES Walcott. See *Isoteloides homalonotoides*.

ASAPHUS HUTTONI Billings. See *Basilicus huttoni*.

ASAPHUS ILLÆNOIDES Billings. See *Symphysurus illænoides*.

ASAPHUS (ISOTELUS) IOWENSIS Owen. See *Isotelus iowensis*.

**Asaphus(?) latimarginata Hall.**

Asaphus? latimarginata Hall, Pal. New York, 1, 1847, p. 253, pl. 66, figs. 4a, b.

Asaphus latimarginatus Chapman, Canadian Jour., n. s., 2, 1857, p. 47.

Utica: Near Watertown, Jefferson County, New York.

Observation.—Possibly the same as *Ogygites canadensis* (Chapman).

ASAPHUS LIMULURUS Green. See *Dalmanites limulurus*.

ASAPHUS MARGINALIS Collie. See *Hemigyaspis collicana*.

ASAPHUS MARGINALIS Hall. See *Basilicus marginalis*.

ASAPHUS MAXIMUS Clarke. See *Isotelus maximus*.

*Asaphus megalophthalmus* Troost.

*Asaphus megalophthalmus* Troost, Mem. Soc. Geol. France, 3, 1838, p. 94, pl. 11, figs. 1-5; 5th Geol. Rep. Tennessee, 1840, p. 57; 6th Geol. Rep. Tennessee, 1841, p. 175 (nom. nud.).

Silurian or Devonian: Perry County, Tennessee.

Observation.—Not recognized. Probably refers to some Devonian species of *Phacops*.

ASAPHUS MEGISTOS of authors. See *Isotelus maximus*.

*Asaphus micropleurus* Green.

Not recognized.

*Asaphus micropleurus* Green, Suppl. Mon. Tril. N. A., 1835, p. 21, cast No. 41.

Trenton: Glens Falls, New York.

ASAPHUS MORRISII Billings. See *Basilicus huttoni*.

ASAPHUS MURCHISONI Castelnau. See *Isotelus gigas*.

ASAPHUS NODOSTRIATUS Hall. See *Bathyrurus extans*.

ASAPHUS? NOTANS Billings. See *Brachyaspis notans*.

ASAPHUS OBTUSUS Hall. See *Onchometopus obtusus*.

**Asaphus(?) pelops** Billings.

Asaphus pelops Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 317, fig. 304a, b.

Canadian (Beekmantown): Bedford, Missisquoi County, Quebec.

**ASAPHUS PLANUS** Dalman. See *Isotelus gigas*.

**ASAPHUS PLATYCEPHALUS** Stokes. See *Isotelus gigas*.

**ASAPHUS PLATYCEPHALUS** Billings. See *Isotelus latus* and *Brachyaspsis altilis*.

**Asaphus(?) quadraticaudatus** Billings.

Asaphus quadraticaudatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 272, fig. 258.

Chazyan (Quebec-N. P.): Table Head and four miles northeast Portland Creek, Newfoundland.

**ASAPHUS ROMINGERI** Walcott. See *Basilicus romingeri*.

**ASAPHUS SUSÆ** Whitfield. See *Onchometopus susæ*.

**ASAPHUS STOKESII** Murchison. See *Proetus stokesii*.

**Asaphus tetragonocephalus** Green.

Asaphus tetragonocephalus Green, Amer. Jour. Sci., 25, 1834, p. 335; Suppl. Mon. Tril. N. A., 1835, p. 12, cast 38.

Ordovician(?): ?Newport, New York.

*Plastotype*.—Cat. No. 4948, U.S.N.M.

Observation.—The type is a specimen made up of two fragments of unidentified Cambrian trilobites, probably *Olenus*.

**ASAPHUS? TRENTONENSIS** Conrad. See *Amphilichas trentonensis*.

**ASAPHUS TRIANGULATUS** Whitfield. See *Isoteloides homalonotoides*.

**ASAPHUS ULRICHI** Miller. See *Basilicus romingeri*.

**ASAPHUS VETUSTUS** Hall. See *Basilicus vetustus*.

**ASAPHUS (ISOTELUS) VIGILANS** Meek and Worthen. See *Nileus vigilans*.

**ASAPHUS WETHERILLI** Green. See *Dalmanites limulurus*.

**ASAPHUS WISCONSINENSIS** Walcott. See *Basilicus romingeri*.

**ASCOCERAS** Barrande.

Genotype: *A. bohemicum* Barrande.

Ascoceras Barrande in Haidinger's Mittheil. d. Fr. d. Naturw., 3, 1847, p. 264-269; Neues Jahrb. f. Min., etc., 1854, p. 11, pl. 1, fig. 13a, b.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 639.—Barrande, Neues Jahrb. f. Min., etc., 1855, pp. 257, 260, pl. 3, figs. 1-10, p. 320; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 160, pl. 5, figs. 16-28.—Woodward, Mem. Mollusca, pt. 3, 1856, p. 450.—Billings, Canadian Nat. Geol., 2, 1857, p. 137, fig. 9.—Barrande, Neues Jahrb. f. Min., etc., 1860, p. 653; Syst. Sil. du Centre Boheme, 2, pt. 1, 1867, p. 334.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, p. 26, fig. 3.—Blake, Mon. British Foss. Cephalopoda, 1882, p. 60.—Zittel, Handb. Pal., 2, Munich, 1884, p. 372.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 279; 23, 1888, p. 483.—Lindström, Geol. Mag., dec. 3, 5, 1888, p. 532.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 246; 2, 1891, p. 387.—Miller, N. A. Geol. Pal. 1889, p. 432.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 23, No. 12, 1890, p. 14.—Koken, Die Leitfossilien, Leipzig, 1896, p. 49, text fig. 32, fig. 3.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 516; 2d ed., 1913, p. 596.



**Ascoceras anticostiense** Billings.

*Ascoceras newberryi* Billings (part), Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 163, fig. 148b (adv. sheets, 1862).

*Ascoceras Anticostiense* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1865, p. 60 (loc. ref.).

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

**Ascoceras boreale** Parks.

*Ascoceras boreale* Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 34.

Mohawkian or Richmond: Shamattawa River, Manitoba.

**ASCOCERAS CANADENSE** Billings. See *Billingsites canadensis*.

**Ascoceras costulatum** Whiteaves.

*Ascoceras costulatum* Whiteaves, Canadian Rec. Sci., 6, 1895, p. 394; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 215, pl. 22, fig. 1.

Black River or Richmond: Lake Winnipeg, Canada.

**Ascoceras gibberosum** Sardeson.

*Ascoceras gibberosum* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 102, pl. 6, figs. 8-10.

Ozarkian (Oneota): Dresbach, Minnesota.

**Ascoceras indianense** Newell.

*Ascoceras Indianensis* Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 484, figs.

Niagaran: Delphi, Indiana.

**Ascoceras newberryi** Billings.

*Ascoceras Newberryi* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 163, fig. 148a (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 23, 59 (loc. ref.).—Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 484.

Richmond (English Head and Charleton) and Gamachian: English Head, etc., Anticosti.

Niagaran: Delphi, Indiana (Newell).

**ASCOCERAS NEWBERRYI** Billings (part). See *Ascoceras anticostiense*.

**Ascoceras southwelli** Worthen.

*Ascoceras southwelli* Worthen, Geol. Surv. Illinois, 8, 1890, p. 151, pl. 27, figs. 2, 2a.

Niagaran: Port Byron, Illinois.

**Ascoceras townsendi** Whiteaves.

*Ascoceras Townsendii* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 41, pl. 6, figs. 4, 4a; pt. 2, 1895, p. 103.

Niagaran (Guelph): Durham, Ontario.

**ASCODICTYON** Nicholson and Etheridge, Jun.

Genotype: *A. stellatum* Nicholson and Etheridge, Jun.

*Ascodictyon* Nicholson and Etheridge, Jun., Ann. Mag. Nat. Hist. 4th ser., 19, 1877, p. 463.—Vine, Quart. Jour. Geol. Soc. London, 37, 1881, p. 618; 38, 1882, p. 52; Rep. 53d Meeting Brit. Assoc. Adv. Sci., 1884, p. 185; Proc. Yorkshire Geol. Polytechnic Soc., 9, 1887, p. 183; 12, 1892, p. 86.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 367.—Simpson, 14th Rep. State Geol. New York for 1894, 1897, p. 603.—Nickles

**ASCODICTYON**—Continued.

and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 19, 172.—Ulrich and Bassler, Smiths. Misc. Coll., 45, 1904, p. 285.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 117.

**ASCODICTYON RADIANS Vine.** See *Vinella radiciformis*.

**ASCODICTYON RADICIFORME Vine.** See *Vinella radiciformis*.

**Ascodictyon siluriense Vine.**

*Ascodictyon stellatum* Vine (not Nicholson and Etheridge), Quart. Jour. Geol. Soc. London, 37, 1881, p. 618.

*Ascodictyon stellatum* var. *siluriense* Vine, Quart. Jour. Geol. Soc. London, 38, 1882, p. 52, figs. 1, 2; Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 81, fig. 7; Proc. Yorkshire Geol. and Polytech. Soc., 9, 1887, p. 184, pl. 12, fig. 6.

*Ascodictyon siluriense* Vine, Proc. Yorkshire Geol. Polytech. Soc., 12, 1892, p. 88, pl. 2, fig. 1.—Ulrich and Bassler, Smiths. Misc. Coll., 45, 1904, p. 286, pl. 68, figs. 11, 12.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 14, pl. 4, figs. 6–8.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 260, pl. 46, fig. 2.

Silurian: Shropshire, England (Wenlock); Lockport, etc., New York; Ontario, Canada (Rochester); Waldron, Indiana; Newsom, Tennessee (Waldron); Island of Anticosti (Jupiter River).

Helderbergian (Keyser): Cash Valley, Maryland.

*Plesiotypes*.—Cat. Nos. 43135, 43138, U.S.N.M.

**ASCODICTYON STELLATUM Vine.** See *Ascodictyon siluriense*.

**ASCODICTYON STELLATUM SILURIENSE Vine.** See *Ascodictyon siluriense*.

**ASPIDOPORA** Ulrich.

Genotype: *Aspidopora areolata* Ulrich.

*Aspidopora* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 373; Geol. Minnesota, 3, 1893, p. 254.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 584.—Nickels and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 29.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 130.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 740.

**Aspidopora areolata** Ulrich.

*Aspidopora areolata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 164, pl. 7, figs. 2–2c.

*Monticulipora areolata* J. F. James, *ibid.*, 16, 1894, p. 183.

Eden (Fulton): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 43632, U.S.N.M.

**Aspidopora calycula** (James).

*Lichenalia?* *calycula* James, Cat. Foss. Cincinnati Group, 1871 (not defined).

*Chætetes?* *calyculus* James, Introd. Cat. Foss. Cincinnati Group, 1875, p. 1.

*Monticulipora* (*Diplotrypa*) *calycula* Nicholson, Genus *Monticulipora*, 1881, p. 165, pl. 4, figs. 4–4b.

*Prasopora calycula* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 165.

*Monticulipora calycula* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 167.—J. F. James, *ibid.*, 16, 1904, p. 184.

*Aspidopora calycula* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 173.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 16, pl. 1, figs. 8–10.

Trenton (Upper): Covington, Kentucky, and vicinity.



**Aspidopora eccentrica** (James).

Monticulipora (Heterotrypa?) *eccentrica* James, Paleontologist, No. 6, 1882, p. 48; No. 7, pl. 1, figs. 6, 6a.

Monticulipora *eccentrica* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 167, pl. 2, figs. 2a-c.—J. F. James, *ibid.*, 16, 1894, p. 185.

Aspidopora *eccentrica* Ulrich, Geol. Minnesota, 3, 1893, p. 255.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 17, pl. 2, figs. 8-12; pl. 5, figs. 7, 8.

Eden (Southgate): Cincinnati, Ohio, and vicinity.

**Aspidopora elegantula** (Ulrich).

Aspidopora *elegantula* Ulrich, Geol. Minnesota, 3, 1893, p. 256, pl. 17, figs. 13-21.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 162-164 (p. 584).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 130, fig. 186e.

Trenton (Prosser): Kenyon and St. Paul, Minnesota.

*Cotypes*.—Cat. No. 45499, U.S.N.M.

**Aspidopora newberryi** (Nicholson).

Chaetetes *Newberryi* Nicholson, Pal. Ohio, 2, 1875, p. 212, pl. 22, figs. 4, 4a.

Monticulipora (Prasopora) *Newberryi* Nicholson, Genus Monticulipora, 1881, p. 212, pl. 4, figs. 1-1e.

Prasopora? *newberryi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 165.

Aspidopora *newberryi* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 91.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 130.

Monticulipora *newberryi* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 164.—J. F. James, *ibid.*, 16, 1894, p. 179.

Eden (Economy): Cincinnati, Ohio, and vicinity.

**Aspidopora parasitica** (Ulrich).

Aspidopora *parasitica* Ulrich (part), 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 90; Geol. Minnesota, 3, 1893, p. 255, pl. 17, figs. 26-32.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 180.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

*Cotypes*.—Cat. No. 44051, U.S.N.M.

**Aspidopora parmula** (Foerste).

Prasopora *parmula* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 170; 3, 1888, pl. 15, fig. 14.

Aspidopora *parmula* Foerste, Geol. Surv. Ohio, 7, 1895, p. 600, pl. 28, fig. 14.

Upper Medinan (Brassfield): Dayton, and Clinton County, Ohio.

**Aspidopora parmula fenestelliformis** Foerste.

Aspidopora *parmula* var. *fenestelliformis* Foerste, Geol. Surv. Ohio, 7, 1895, p. 600.

Upper Medinan (Brassfield): Dayton, Ohio.

ASTERIAS ANTHONII Dana. See *Petraster jamesi*.

ASTERIAS ANTIQUA Troost. See *Mesopalæaster antiqua*.

ASTERIAS ANTIQUATA Locke. See *Promopalæaster speciosa*.

ASTERIAS (FOSSIL) Graham, Anthony, and James. See *Petraster americana*.

ASTERIAS MATUTINA Hall. See *Hudsonaster matutina*.

ASTRÆOPHYLLUM Nicholson and Hinde. See *Strombodes Schweigger*.

ASTRÆOPORA VETUSTA D'Orbigny. See *Protarea vetusta*.

**ASTRÆOSPONGIA** Roemer. Genotype: *Blumenbachium meniscus* Roemer.  
*Blumenbachium* Roemer (not König, 1820), *Neues Jahrb. f. Min., etc.*, 1848, pp. 680, 682.

*Astræospongia* Roemer, *Sil. Fauna West. Tennessee*, Breslau, 1860, p. 13; *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 248.—Zittel, *Handb. Pal.*, 1, Munich, 1879, p. 185.—Roemer, *Leth. geog.*, 1, Theil, *Leth. Pal., Erste Lief.*, 1880, p. 313.—Hinde, *Mon. Brit. Foss. Sponges*, *Pal. Soc.*, 1888, p. 133.—Miller, *N. A. Geol. Pal.*, 1889, p. 154.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 342.—Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 56.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 17.—Zittel-Eastman *Textb. Pal.*, 2d ed., 1913, p. 62.

***Astræospongia meniscus* (Roemer).**

*Blumenbachium meniscus* Roemer, *Neues Jahrb. Min.*, 1848, p. 683, pl. 9, fig. 1.—Oswald, *Zeits. d. d. geol. Gesell.*, 2, 1850, p. 83.

*Astræospongia meniscus* Roemer, *Sil. Fauna West. Tennessee*, 1860, p. 14, pl. 1, figs. 6, 6a-d.—Safford, *Geol. Tennessee*, 1869, pp. 311, 320, pl. 5 (H), figs. 1a-e.—Roemer, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 248; *Leth. geog.*, *Leth. Pal.*, 1, Atlas, 1876, pl. 9, fig. 2.—J. W. Hall and Gaertner, 30th Rep. New York State Mus. *Nat. Hist.*, 1878, pp. 111-116, pl. 3, pp. 1-6.—Roemer, *Leth. geog.*, 1, Theil., *Leth. Pal., Erste Lief.*, 1880, p. 314, pl. 9, figs. 2a-2e.—Hinde, *Cat. Foss. Sponges Brit. Mus.*, 1883, p. 148.—Miller, *N. A. Geol. Pal.*, 1889, p. 154, text fig. 90.—Foerste, *Jour. Geol.*, 11, 1903, p. 713, (loc. occ.).—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 18, fig. 27.

Niagaran: Brownsport, Perryville, etc., Tennessee (Brownsport); Louisville, Kentucky (Louisville).

**ASTRASPIIS** Walcott.

Genotype: *A. desiderata* Walcott.

*Astraspis* Walcott, *Bull. Geol. Soc. Amer.*, 3, 1892, p. 166.

***Astraspis desiderata* Walcott.**

*Astraspis desiderata* Walcott, *Bull. Geol. Soc. Amer.*, 3, 1892, p. 166, pl. 3, figs. 6-14, pl. 4, figs. 1-4.

Black River (Harding): Canyon City, Colorado.

***Astrea fungiformis* Owen.**

Not recognized.

*Astrea fungiformis* Owen, *Geol. Expl. Iowa, Wisconsin, and Illinois*, 2d ed., 1844, p. 78, pl. 14, fig. 11.

Niagaran: Iowa and Wisconsin.

**ASTREA? GIGAS** Owen. . See *Strombodes gigas*.

**ASTREA MAMILLARIS** Owen. See *Strombodes mamillaris*.

**ASTREOPORA ORGANUM** D'Orbigny. See *Syringophyllum organum*.

**ASTROCERIUUM** Hall. See *Favosites Lamarck*.

**ASTROCERIUUM CONSTRICTUM** Hall. See *Favosites constrictum*.

**ASTROCERIUUM PARASITICUM** Hall. See *Favosites hisingeri*.

**ASTROCERIUUM PYRIFORME** Hall. See *Favosites pyriformis*.

**ASTROCERIUUM VENUSTUM** Whitfield. See *Favosites hisingeri*.

**ASTROCONIA** Sollas.

Genotype: *A. granti* Sollas.

*Astroconia* Sollas, *Quart. Jour. Geol. Soc. London*, 36, 1881, p. 254.—Miller, *N. A. Geol. Pal.*, 1889, p. 154.



**Astroconia granti** Sollas.

*Astroconia Granti* Sollas, Quart. Jour. Geol. Soc. London, 37, 1881, pp. 254, 255, figs. 1-11.—Rauff, Palæontographica, 40, 1894, p. 278, fig. 58.

Niagaran dolomite: Hamilton, Ontario.

**ASTROCRINITES** Conrad. See *Mariacrinus* Hall.

**ASTROCRINITES PACHYDACTYLUS** Conrad. See *Melocrinus pachydactylus*.

**ASTROCYSTITES** Whiteaves.

Genotype: *A. ottawaensis* Whiteaves.

*Astrocystites* Whiteaves, Canadian Rec. Sci., 7, 1897, p. 287.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 734.

*Steganoblastus* Whiteaves, Canadian Rec. Sci., 7, 1897, p. 305 (proposed to replace *Astrocystites* which was believed to be too much like *Asterocystis* Haeckel).—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 209, fig. 7.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 320.—Springer, Zittel-Eastman Textb. Pal., 1, 1913, p. 160.

**Astrocystites ottawaensis** Whiteaves.

*Astrocystites Ottawaensis* Whiteaves, Canadian Rec. Sci., 7, 1897, p. 287, figs. 1-3.

*Steganoblastus canadensis* (in error for *ottawaensis*) Whiteaves, Canadian Rec. Sci., 7, 1898, p. 396.

*Steganoblastus ottawaensis* Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 210, fig. 7.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 316, figs. 21, 21a, 22; p. 321, figs. 23, 24.

Trenton (Curdsville): Ottawa, Ontario.

**Astroporites** Lambe.

Genotype: *A. ottawaensis* Lambe.

*Astroporites* Lambe, Canadian Rec. Sci., 7, 1896, p. 1.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 174.

**Astroporites ottawaensis** Lambe.

*Astroporites Ottawaensis* Lambe, Canadian Rec. Sci., 7, 1896, p. 1, pl. 1.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 173, 174.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 46.

Trenton (Curdsville): Hull near Ottawa, and Kirkfield, Ontario; Mercer County, Kentucky.

Observation.—This genus and species, originally described as a bryozoan, is founded upon the attached basal disk of some crinoid.

**ASTYLOMANON** Rauff. See *Palæomanon* Roemer.

**ASTYLOMANON CRATERA** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA ARYBALLIUM** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA BALANTIUM** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA CANTHARIUM** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA CYLIX** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA LECYTHIUM** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA PATERA** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA POTERIUM** Rauff. See *Palæomanon cratera*.

**ASTYLOMANON CRATERA PROMISCUUM** Rauff. See *Palæomanon cratera*.

*ASTYLOMANON CRATERA* PROTOTYPUM Rauff. See *Palæomanon cratera*.

*ASTYLOMANON PLEURIEXCAVATUM* Rauff. See *Palæomanon pleuriexcavatum*.

*ASTYLOMANON VERRUCOSUM* Rauff. See *Palæomanon verrucosum*.

*ASTYLOMANON VERRUCOSUM BULLIFERA* Rauff. See *Palæomanon verrucosum bullifera*.

**ASTYLOSPONGIA** Roemer.

Genotype: *Siphonia præmorsa* Goldfuss.

*Astylospongia* Roemer, Sil. Fauna West Tennessee, 1860, p. 7; Cincinnati Quart. Jour. Sci., 1, 1874, p. 31.—Zittel, Ann. Mag. Nat. Hist., 4th ser., 20, 1877, p. 501; Neues Jahrb. Min., Geol. Pal., 1877, p. 353; Abh. math.-phys. Classe Akad. Wiss., 13, 1 Abth., 1878, p. 44.—Martin, Arch. Ver. Freun. Naturg. Mechlenburg, Jahrg., 31, 1878, pp. 2, 18.—Zittel, Handb. Pal., 1, 1879, p. 172.—Roemer, Leth. geog., 1, Theil. Leth. Pal., Erste Lief., 1880, p. 307.—Hinde, Cat. Foss. Sponges Brit. Mus., 1883, p. 91.—Zittel, Ann. Mag. Nat. Hist., 5th ser. 14, 1884, p. 271; Neues Jahrb. f. Min., Geol. Pal., 2, 1884, p. 75.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1887, pp. 246, 247.—Hinde, Mon. Brit. Foss. Sponges, Palæont. Soc., 1888, p. 112.—Miller, N. A. Geol. Pal., 1889, p. 154.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 55.—Rauff, Palæontographica, 40, 1894, p. 289.—James, Amer. Nat., 29, 1895, p. 543.—Koken, Die Leitfossilien, 1896, p. 337.—Zittel-Eastman Textb. Pal., 1, 1900, p. 50; 2d ed., 1913, p. 55.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.

*ASTYLOSPONGIA (PALÆOMANON) BURSA* Hall. See *Palæomanon bursa*.

***Astylospongia?? christiana*** Meek and Worthen.

*Astylospongia?? christiana* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 344, pl. 5, figs. 3a-c.

Niagaran: Carroll County, Illinois.

*ASTYLOSPONGIA GREGARIA* James. See *Hindia gregaria*.

***Astylospongia imbricato-articulata*** (Roemer).

*Siphonia imbricato-articulata* Roemer, Neues Jahr. Min. Geol., Pal., 1848, p. 685.

*Astylospongia imbricato-articulata* Roemer, Sil. Fauna West Tennessee, 1860, p. 12, pl. 1, figs. 5, 5a; Cincinnati Quar. Jour. Sci., 1, 1874, p. 191.—Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 104; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 224.—Foerste, Jour. Geol., 11, 1903, p. 714 (loc. occ.).

Niagaran: Various localities in Decatur and Perry Counties, Tennessee (Brownsville); Louisville, Kentucky (Louisville).

*ASTYLOSPONGIA INCISO-LOBATA* Roemer. See *Caryomanon incislobatum*.

*ASTYLOSPONGIA INORNATA* Hall. See *Hindia sphaeroidalis*.

***Astylospongia parvula*** Billings.

*Astylospongia parvula* Billings, Geol. Vermont, 2, 1861, p. 956; Rep. Econ. Geol. Vermont, 1862, p. 956; Pal. Foss., 1, Geol. Surv. Canada, 1863, p. 20. (Advance sheets, 1861.)

Trenton: Ottawa, Ontario.

***Astylospongia præmorsa*** (Goldfuss).

*Siphonia præmorsa* Goldfuss, Petref. Germ., 1826, p. 17, pl. 6, fig. 9a.

*Astylospongia præmorsa* Roemer, Sil. Fauna West Tennessee, 1860, p. 8, pl. 1, figs. 1, 1a-e.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 377, fig. 352—



**Astylospongia præmorsa**—Continued.

Roemer, Cincinnati Quart. Jour. Sci., 1, 1874, p. 32.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 499, pl. 25, figs. 2, 2a.—Roemer, Leth. geog., 1, Theil, Leth. Pal., Erste Lief, 1880, p. 307, pl. 9, figs. 1a-c.—Miller, N. A. Geol. Pal., 1889, p. 154, fig. 91.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 224, fig. 3.—Rauff, Palæontographica, 40, 1894, p. 309, pl. 11, fig. 3.—Walker, Jour. and Proc. Hamilton Assoc., 11, 1895, p. 87, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14, fig. 22.

Niagaran: West Tennessee, and many other localities.

*Plesiotype*.—Cat. No. 49719, U.S.N.M.

Observation.—A very complete bibliography of this species is given by Rauff, 1894.

**ASTYLOSPONGIA PRÆMORSA** Hall. See *Astylospongia præmorsa pusilla*.

**ASTYLOSPONGIA PRÆMORSA** Roemer. See *Palæomanon verrucosum*.

**ASTYLOSPONGIA PRÆMORSA** var. **NUXMOCHATA** Hall. See *Caryospongia juglans nuxmoschata*.

**Astylospongia præmorsa pusilla** Rauff.

*Astylospongia præmorsa* Hall, Trans. Albany Inst., 4, 1863, p. 228; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 3, figs. 4-14 (Museum ed., 1879); 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 222, pl. 2, figs. 4-11, 14.

*Astylospongia præmorsa* var. *pusilla* Rauff, Palæontographica, 40, 1894, p. 309. Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

*Plesiotypes*.—Cat. No. 46547, U.S.N.M.

**ASTYLOSPONGIA ROEMERI** Hinde. See *Caryomanon roemeri*.

**ASTYLOSPONGIA STELLATIM-SULCATA** Roemer. See *Carpomanon stellatim-sulcatum*.

**ASTYLOSPONGIA SUBROTUNDUS** James. See *Hindia subrotunda*.

**ASTYLOSPONGIA TUMIDUS** James. See *Pasceolus darwini*.

**ATACTOPORA** Ulrich (part). See *Atactoporella* Ulrich.

**ATACTOPORA** Ulrich.

Genotype: *Atactopora hirsuta* Ulrich.

*Atactopora* Ulrich (part), Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 119; Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154; 6, 1883, p. 245.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 377; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 278.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 563.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 31.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 334.

**Atactopora angularis** Ulrich and Bassler.

*Atactopora angularis* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 32, pl. 8, figs. 10-12.

Richmond (Waynesville): Waynesville, Ohio.

*Holotype*.—Cat. No. 43193, U.S.N.M.

**Atactopora hirsuta** Ulrich.

*Atactopora hirsuta* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 120, pl. 12, figs. 3-3b; 6, 1883, p. 245, pl. 12, figs. 1, 1a.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 31, pl. 8, fig. 14.

Eden and Maysville (Fairview): Covington and Newport, Kentucky; Cincinnati, Ohio.

*Holotype*.—Cat. No. 43619, U.S.N.M.

**Atactopora intermedia** Cumings and Galloway.

*Atactopora intermedia* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 73, pl. 4, figs. 2, 2a; pl. 5, figs. 1-1d.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

**Atactopora maculata** Ulrich.

*Atactopora maculata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 121, pl. 12, figs. 2-22; 6, 1883, p. 245, pl. 12, figs. 2, 2a; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 466 (p. 278).—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 31, pl. 8, fig. 13.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333, fig. 483.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43619, U.S.N.M.

**ATACTOPORA MULTIGRANOSA** Ulrich. See *Atactoporella multigranosa*.

**ATACTOPORA MUNDULA** Ulrich. See *Atactoporella mundula*.

**ATACTOPORA ORTONI** Ulrich. See *Atactoporella ortonii*.

**ATACTOPORA SEPTOSA** Ulrich. See *Amplexopora septosa*.

**ATACTOPORA SUBRAMOSA** Ulrich. See *Heterotrypa subramosa*.

**ATACTOPORA TENELLA** Ulrich. See *Atactoporella tenella*.

**ATACTOPORELLA** Ulrich.

Genotype: *Atactoporella typicalis* Ulrich

*Atactopora* Ulrich (part), Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 119.

*Peronopora Nicholsoni* (part), Genus *Monticulipora*, 1881, p. 215.

*Atactoporella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 247.—Miller, N. A. Geol. Pal., 1899, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 370; Geol. Minnesota, 3, 1893, p. 222; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 272.—Simpson, 14th Ann. Rep. State. Geol. New York for 1894, 1897, p. 585.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 28.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 127.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 740.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 331.

**ATACTOPORELLA CRASSA** Ulrich. See *Homotrypella hospitalis crassa*.

**Atactoporella insueta** Ulrich.

*Atactoporella insueta* Ulrich, Geol. Minnesota, 3, 1893, p. 224, pl. 15, figs. 13-15; pl. 18, figs. 5-8.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

*Cotypes*.—Cat. No. 43805, U.S.N.M.

**Atactoporella multigranosa** (Ulrich).

*Atactopora multigranosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 122, pl. 12, figs. 1, 1a.

*Atactoporella multigranosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 254, pl. 12, figs. 8, 8a.—J. F. James, *ibid.*, 18, 1895, p. 80.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 769, pl. 7, figs. 2, 2a.

Maysville (Fairmount-Corryville): Hamilton, Morrow, and Cincinnati, Ohio; southeastern Indiana.

*Holotype*.—Cat. No. 43626, U.S.N.M.

**Atactoporella mundula** (Ulrich).

*Atactopora mundula* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 123, pl. 12, figs. 4, 4a..



**Atactoporella mundula**—Continued.

- Atactoporella mundula* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 252, pl. 12, figs. 6, 6a.—J. F. James, *ibid.*, 18, 1895, p. 80.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 770, pl. 7, figs. 3, 3a; pl. 26, fig. 6. Maysville (Fairmount): Covington, Kentucky, and Cincinnati, Ohio.  
*Holotype*.—Cat. No. 43623, U.S.N.M.

**Atactoporella newportensis** Ulrich.

- Atactoporella newportensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 250, pl. 12, figs. 4-4b.—Miller, N. A. Geol. Pal., 1889, fig. 456, p. 29.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 770, pl. 7, fig. 4; pl. 26, fig. 7.  
*Monticulipora newportensis* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 183.—James, *ibid.*, 16, 1894, p. 206.  
 Eden (Economy): Newport, Kentucky.  
*Cotypes*.—Cat. No. 43627, U.S.N.M.

**Atactoporella ortonii** (Nicholson).

- Chaetetes Ortoni* Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 513, pl. 29, figs. 15-15b; Pal. Ohio, 2, 1875, p. 211, pl. 22, figs. 3-3b.  
*Atactopora ortonii* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 120 (gen. ref.).  
*Monticulipora* (Peronopora?) *Ortoni* Nicholson, Genus *Monticulipora*, 1881, p. 228, pl. 3, figs. 4-4d.  
*Atactoporella ortonii* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 256, pl. 12, figs. 7, 7a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 771, pl. 7, figs. 5, 5a; pl. 26, fig. 11.  
*Monticulipora ortonii* James and James, Jour. Cincinnati Soc. Nat. Hist., 1888, 11, p. 22.—James, *ibid.*, 18, 1895, p. 79.  
 Maysville (Bellevue and Corryville): Cincinnati, Ohio, and vicinity.  
*Plesiotype*.—Cat. No. 43629, U.S.N.M.

**Atactoporella ramosa** Ulrich.

- Atactoporella ramosa* Ulrich, Geol. Minnesota, 3, 1893, p. 226, pl. 20, figs. 22-27. Black River (Decorah): Cannon Falls, Minnesota.  
*Cotypes*.—Cat. No. 43500, U.S.N.M.

**Atactoporella schucherti** Ulrich.

- Atactoporella schucherti* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 251, pl. 12, figs. 5-5b.—J. F. James, *ibid.*, 18, 1895, p. 80.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 772, pl. 7, figs. 6, 6a.  
 Richmond (Waynesville-Whitewater): Oxford, Waynesville, etc., Ohio; Richmond and Versailles, Indiana.  
*Holotype*.—Cat. No. 43628, U.S.N.M.

**Atactoporella tenella** (Ulrich).

- Atactopora tenella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 123, pl. 12, figs. 5, 5a.  
*Atactoporella tenella* Ulrich, *ibid.*, 6, 1883, p. 246.—J. F. James, *ibid.*, 18, 1895, p. 80.  
 Maysville (Fairmount): Cincinnati, Ohio, and vicinity.  
*Holotype*.—Cat. No. 43624, U.S.N.M.

**Atactoporella typicalis** (Ulrich).

- Atactoporella typicalis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 248, pl. 12, figs. 3-3d.—J. F. James, *ibid.*, 18, 1895, p. 80.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 272, fig. 450.—Simpson, 14th Ann. Rep. State

**Atactoporella typicalis**—Continued.

Geol. New York for 1894, 1897, p. 585, figs. 165–167.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 128, fig. 186b.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 332.

Eden (Economy): Covington, Kentucky, and vicinity.

*Cotypes*.—Cat. No. 43625, U.S.N.M.

**Atactoporella typicalis præcipita** Ulrich.

*Atactoporella typicalis* var. *præcipita* Ulrich, Geol. Minnesota, 3, 1893, p. 223, pl. 15, figs. 16, 17, pl. 18, figs. 1–4.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

*Cotypes*.—Cat. Nos. 43806, 43872, U.S.N.M.

**ATAXIACRINUS** Lyon. See *Anomalocrinus* Meek.

**ATAXOCRINUS** Bather. See *Anomalocrinus* Meek.

**ATELOCYSTIS** Haeckel. See *Ateleocystites* Billings.

**ATELEOCYSTITES** Billings.

Genotype: *A. huxleyi* Billings.

*Ateleocystites* Billings, Geol. Surv. Canada, Can. Org. Rem., dec. 3, 1858, pp.

72, 73.—Chapman, Expos. Min. Geol. Canada, 1864, p. 110.—Salter, Cat.

Camb. Sil. Foss., 1873, p. 128.—Zittel, Handb. Pal., 1, Munich, 1879, p.

413.—Woodward, Geol. Mag., dec. 2, 7, 1880, p. 194.—Walther, Palæonto-

graphica, 32, 1886, p. 193.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 674.

*Ateleocystis* Haeckel, Amphorideen u. Cystoideen, 1896, p. 41, pl. 2, figs. 10–12.

*Enoploura* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 1, 1879, p. 163.—Jaekel,

Zeits. d. d. Geol. Gesell., 52, 1900, p. 668.—Bather, Treatise on Zool., pt. 3,

Echinoderma, London, 1900, p. 51 (Genotype *Anomalocystites balanoides* Meek).

*Anomalocystites* in part of authors.

**Ateleocystites balanoides** (Meek).

*Anomalocystites* (*Ateleocystites*?) *balanoides* Meek, Amer. Jour. Sci. Arts, 3d ser., 3, 1872, p. 423; Geol. Surv. Ohio, 1, pt. 2, 1873, p. 41, pl. 3, bis. fig. 6a–c.

*Enoploura balanoides* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 162, pl. 7, figs. 1a–g; p. 164, pl. 1, figs. 1–5.

*Ateleocystites balanoides* Woodward, Geol. Mag., dec. 2, 7, 1880, p. 198, pl. 6, figs. 5–15.

*Anomalocystites balanoides* Miller, N. A. Geol. Pal., 1889, p. 224, fig. 247.

*Placocystis balanoides* Haeckel, Amphorideen u. Cystoideen, 1896, pl. 2, figs. 5–7.

*Placocystis crustacea* Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 39, figs. 1, 2.

*Enoploura crustacea* Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 51.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**Ateleocystites huxleyi** Billings.

*Ateleocystites Huxleyi* Billings, Geol. Surv. Canada, Can. Org. Rem., dec. 3, 1858, pp. 72, 73, fig. 4.—Woodward, Geol. Mag., 7, 1870, p. 261, footnote;

8, 1871, p. 72, text figs. 1–7; dec. 2, 7, 1880, pl. 6, fig. 1.

*Anomalocystites Huxleyi* Miller, N. A. Geol. Pal., 1889, p. 224.

*Ateleocystis Huxleyi* Haeckel, Amphor. und Cystoid., 1896, p. 41.

Trenton (Curdsville): Hull and Ottawa, Canada.



- ATHYRIS** McCoy. Genotype: *Terebratulina concentrica* Von Buch.  
*Athyris* McCoy, Carb. Fossils Ireland, 1844, pp. 128, 146.—Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 73.—Billings, Canadian Jour., 5, 1860, p. 273; 6, 1861, p. 138; Pal. Fossils, 1, 1862, p. 144.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, pp. 152, 258; Pal. New York, 4, 1867, p. 282.—Billings, Amer. Jour. Sci., 44, 1867, p. 48.—Herrick, Bull. Denison Univ., 4, 1888, p. 14.—Nettelroth, Kentucky Fossil Shells, Mem. Geol. Surv. Kentucky, 1889, p. 87.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 83, fig. 57 on p. 86; 13th Ann. Rep. New York State Geol., 1895, p. 777.  
*Spirigera* D'Orbigny, Paris Acad. Sci., Comptes Rendus, 25, 1847, p. 268.  
*Euthyris* Quenstedt, Petrefactenkunde Deutschlands, 1871, p. 442.

**ATHYRIS** Billings (1863). See *Meristella* Hall.

**ATHYRIS ANTICOSTIENSIS** Billings. See *Catazyga anticostiensis*.

**ATHYRIS BOREALIS** Billings. See *Catazyga headi borealis*.

**ATHYRIS CYLINDRICA** Billings. See *Whitfieldella cylindrica*.

**ATHYRIS HEADI** Billings. See *Catazyga headi*.

**ATHYRIS HEADI ANTICOSTIENSIS** Billings. See *Catazyga anticostiensis*.

**ATHYRIS HEADI BOREALIS** Billings. See *Catazyga headi borealis*.

**ATHYRIS INTERMEDIA** Nicholson and Hinde. See *Whitfieldella intermedia*.

**ATHYRIS JULIA** Billings. See *Whitfieldella(?) julia*.

**ATHYRSIS JUNIA** Billings. See *Hyattidina congesta junia*.

**ATHYRIS LARA** Billings. See *Whitfieldella lara*.

**ATHYRIS NAVIFORMIS** Billings. See *Whitfieldella(?) naviformis*.

**ATHYRIS NITIDA** Hall. See *Whitfieldella nitida*.

**ATHYRIS PRINSTANA** Billings. See *Hindella prinstana*.

**ATHYRIS SOLITARIA** Billings. See *Whitfieldella? solitaria*.

**ATHYRIS? TRISINUATUS** McChesney. See *Meristina trisinuata*.

**ATHYRIS TUMIDA** Roemer. See *Meristina maria roemeri*.

**Athyris(?) tumidula** Billings.

*Athyris tumidula* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 47.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 150.

Anticostian (Gun River and Jupiter River): Jupiter River, etc., Anticosti.

**ATHYRIS TURGIDA** Shaler. See *Hindella prinstana*.

**ATHYRIS UMBONATA** Billings. See *Hindella umbonata*.

**ATOPS FISCHERI** Miller. See *Triarthrus fischeri*.

**ATRYPA** Dalman.Genotype: *Anomia reticularis* Linnæus.

*Atrypa* Dalman, Kongl. Svenska Vet.-Akad. Handl., 1828, p. 102.—Billings, Canadian Nat. Geol., 1, 1856, p. 134; Canadian Jour., 6, 1861, p. 264.—Chapman, Canadian Jour., n. s., 7, 1862, p. 114; Expos. Min. Geol. Canada, 1864, p. 117.—Whitfield, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 141, pl. 1.—Hall, Pal. New York, 4, 1867, p. 312.—Zittel, Handb. Pal., 1, Munich, 1880, p. 688.—Davidson, Mon. Brit. Foss. Brachiopoda, 5, Sil. Suppl., Pal. Soc., 1882, p. 84.—Miller, N. A. Geol. Pal., 1889, p. 335.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 88.—Beecher, Amer. Jour. Sci., 3d ser., 44, 1892, p. 147.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 163; 13th Ann. Rep. New York State Geol., 1895, p. 818.—Koken, Die Leitfossilien, Leipzig, 1896, p. 241, fig. 202, 203.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 226; Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 334.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 195.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 409.

**ATRYPA ACUTIROSTRA** Hall. See *Zygospira*(?) *acutirostris*.

**ATRYPA AFFINIS** Vanuxem. See *Atrypa reticularis*.

**ATRYPA ALTILIS** Hall. See *Camarotoechia plena*.

**ATRYPA AMBIGUA** Hall. See *Camarella ambigua*.

**ATRYPA APRINIS** Hall. See *Homœospira apriniformis*.

***Atrypa aretostriata*** (Foerste).

*Atrypa reticularis aretostriatus* Foerste, Jour. Geol., 11, 1903, p. 710.

*Atrypa aretostriata* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 93, pl. 2, figs. 34A, B.

Niagaran (Brownsport): Near Brownsport Furnace, three miles west Vice Landing, Tennessee.

***Atrypa? biconvexa*** Maynard.

*Atrypa? biconvexa* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 393, pl. 68, figs. 1-3.

Helderbergian (Keyser): Keyser, West Virginia; Cash Valley, Maryland.

**ATRYPA BIDENS** Hall. See *Rhynchonella*(?) *bidens*.

**ATRYPA BIDENTATA** Hall. See *Rhynchonella*(?) *bidentata*.

**ATRYPA BISULCATA** Hall. See *Cyclospira bisulcata*.

**ATRYPA BREVIROSTRIS** Hall. See *Anastrophia brevirostris*.

***Atrypa calvini*** Nettelroth.

*Atrypa calvini* Nettelroth, Kentucky Foss. Shells, Mem. Kentucky Geol. Surv., 1889, p. 89, pl. 32, figs. 64-66.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 440, pl. 8, figs. 13-15.

Niagaran: Louisville, Kentucky (Louisville); Delphi, Pendleton, etc., Indiana (Noblesville).

*Holotype*.—Cat. No. 51331, U.S.N.M.

**ATRYPA CAMURA** Hall. See *Trematospira camura*.

**ATRYPA CAPAX** Conrad. See *Rhynchotrema capax*.

**ATRYPA CHEMUNGENSIS** Conrad. See *Atrypa reticularis*.



- ATRYPA CIRCULARIS* Hall. See *Parastrophia hemiplicata*.
- ATRYPA CONGESTA* Conrad. See *Hyattidina congesta*.
- ATRYPA CORALLIFERA* Hall. See *Dictyonella corallifera*.
- ATRYPA CRASSIROSTRA* Hall. See *Whitfieldella cylindrica*.
- ATRYPA CUNEATA* Hall. See *Rhynchotrete cuneata americana*.
- ATRYPA CUSPIDATA* Hall. See *Triplecia cuspidata*.
- ATRYPA CYLINDRICA* Hall. See *Whitfieldella cylindrica*.
- ATRYPA DEFLECTA* Hall. See *Zygospira deflecta*.
- ATRYPA DENTATA* Hall. See *Rhynchotrema dentatum*.
- ATRYPA DISPARILIS* Hall. See *Atrypina disparilis*.
- ATRYPA DUBIA* Hall. See *Protorhyncha dubia*.
- ATRYPA EMACERATA* Hall. See *Rhynchonella emacerata*.
- ATRYPA EQUIRADIATA* Hall. See *Camarotoëchia æquiradiata*.
- ATRYPA EXIGUA* Hall. See *Zygospira exigua*.
- ATRYPA EXTANS* Emmons. See *Triplecia extans*.
- ATRYPA FLABELLA* Shaler. See *Cœlospira hemispherica*.
- ATRYPA GALEATA* Dalman. See *Gypidula* (*Sieberella*) *galeata*.
- ATRYPA GRAYI* Davidson. See *Streptis grayi*.
- Atrypa* (?) *gibbosa* Hall.**  
*Atrypa gibbosa* Hall, Pal. New York, 2, 1852, p. 79, pl. 20, fig. 10.  
 Clinton: Clinton, New York.
- ATRYPA HEMIPLICATA* Hall. See *Parastrophia hemiplicata*.
- ATRYPA HEMISPHERICA* Sowerby. See *Cœlospira hemispherica*.
- ATRYPA IMBRICATA* Hall. See *Atrypa nodostriata*.
- ATRYPA IMPRESSA* Shaler. See *Atrypa reticularis*.
- ATRYPA INCREBESCENS* Hall. See *Rhynchotrema capax* and *R. inæquivalve*.
- ATRYPA INTERMEDIA* Hall. See *Whitfieldella intermedia*.
- ATRYPA INTERPLICATA* Hall. See *Anastrophia interplicata*.
- ATRYPA LÆVIS* Vanuxem. See *Whitfieldella lævis*.
- ATRYPA LAMELLATA* Hall. See *Camarotoëchia lamellata*.
- ATRYPA?* *LARA* Schuchert. See *Whitfieldella?* *lara*.
- Atrypa laticorrugata* Foerste.**  
*Atrypa lati-corrugata* Foerste, Geol. Ohio, 7, 1895, p. 591, pl. 57A, fig. 16.  
 Upper Medinan (Brassfield): Dayton, Ohio.
- ATRYPA LENS* Sowerby. See *Stricklandinia lens*.
- ATRYPA LENTIFORMIS* Vanuxem. See *Atrypa reticularis*.

**Atrypa mansonii** (Salter).

*Rhynchonella mansonii* Salter, Sutherland's Jour. Voyage Baffins Bay, etc., 2, 1852, p. ccxxi, pl. 5, fig. 5.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 596.

*Atrypa masonii* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 153.

Niagaran: Near Wellington Channel, Bessels Bay, Arctic America.

**Atrypa marginalis** (Dalman).

*Terebratula marginalis* Dalman, Kongl. Svenska Vet.-Akad. Handl. for 1827, 1828, p. 59, pl. 6, fig. 6.

*Atrypa marginalis* Roemer, Sil. Fauna west. Tennessee, 1860, p. 69, pl. 5, fig. 10.—Billings, Cat. Sil. Foss. Anticosti, 1866, p. 46.—Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 197.—Davidson, Geol. Mag., dec. 2, 8, 1881, p. 10, fig. 9; Mon. Brit. Foss. Brachiopoda, 5, Sil. Suppl., Pal. Soc., 1882, p. 122.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 314, pl. 6, figs. 8, 9; Geol. Ohio, 7, 1895, p. 591, pl. 25, figs. 6, 9; pl. 31, figs. 8, 9.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 55, figs. 24, 25.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309.

*Trematospira matthewsoni* McChesney, Descriptions New Pal. Fos., 1860, p. 71; Trans. Chicago Acad. Sci., 1, 1868, p. 32, pl. 7, fig. 3.

*Atrypa nodostriata* Foerste (not Hall), Bull. Denison Univ., 1, 1885, p. 90, pl. 13, fig. 9.

*Atrypa marginalis* var. *multistriata* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 316, pl. 6, fig. 8.

Silurian: Europe; Anticosti, etc., Canada; New York, Pennsylvania, Ohio, etc. (Brassfield-Niagaran).

*ATRYPA MARGINALIS* var. *MULTISTRIATA* Foerste. See *Atrypa marginalis*.

*ATRYPA MODESTA* Hall. See *Zygospira modesta*.

*ATRYPA NAVIFORMIS* Hall. See *Whitfieldella*(?) *naviformis*.

*ATRYPA NEGLECTA* Hall. See *Camarotoechia* (*Stegerhynchus*) *neglecta*.

*ATRYPA NITIDA* Hall. See *Whitfieldella nitida*.

*ATRYPA NITIDA* var. *OBLATA* Hall. See *Whitfieldella oblata*.

*ATRYPA NODOSTRIATA* Foerste. See *Atrypa marginalis*.

**Atrypa nodostriata** Hall.

*Atrypa imbricata* Hall (not Sowerby), Geol. New York, Rep. 4th Dist., 1843, Tab. Org. Rem., 13, fig. 1.

*Atrypa nodostriata* Hall, Pal. New York, 2, 1852, p. 272, pl. 56, fig. 2.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 133, pl. 7, figs. 12–14.—Safford, Geol. Tennessee, 1869, p. 315, text fig. 5.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 196, fig. 114; Bull. New York State Mus., 45, 1901, p. 196, fig. 113.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309, fig. 387.

Niagaran: Lockport, etc., New York (Rochester); Ontario; Ohio; Kentucky; Wisconsin; Tennessee.

*ATRYPA NUCLEOLATA* Hall. See *Whitfieldella*(?) *nucleolata*.

*ATRYPA NUCLEUS* Hall. See *Triplecia nucleus*.

*ATRYPA OBTUSIPPLICATA* Hall. See *Camarotoechia obtusiplicata*.

**Atrypa orbicularis** Owen.

*Atrypa orbicularis* Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 80, pl. 15, fig. 9.



**Atrypa orbicularis**—Continued.

Ordovician: Iowa.

Observation.—Not recognized. Figure represents internal cast of some undetermined brachiopod.

**ATRYPA PHOCA** of authors. See *Lissatrypa phoca*.**ATRYPA PLANOCONVEXA** Hall. See *Cœlospira planoconvexa*.**ATRYPA PLENA** Hall. See *Camarotoechia plena*.**ATRYPA PLICATA** Hall. See *Rhynchonella plicata*.**ATRYPA PLICATELLA** Hall. See *Rhynchonella plicatella*.**ATRYPA PLICATULA** Hall. See *Cœlospira plicatula*.**ATRYPA PLICIFERA** Hall. See *Camarotoechia plena*.**Atrypa præmarginalis** Savage.*Atrypa præmarginalis* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 84, pl. 4, figs. 14-16.

Upper Medinan (Edgewood): Near Edgewood and Watson Station, Pike County, Missouri; near Thebes, Illinois.

**ATRYPA PRISCA** Vanuxem. See *Atrypa reticularis*.**Atrypa putilla** (Hall and Clarke).*Zygospira putilla* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 157, fig. 150; p. 365, pl. 54, figs. 35-37; pl. 83, figs. 29, 30.—Hall, 48th Rep. New York State Mus., 2, 1897, p. 362, pl. 9, figs. 31, 32.—Hall and Clarke, 14th Rep. State Geol. New York for 1894, 1897, p. 362, pl. 9, figs. 31, 32.*Atrypa putilla* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 85, pl. 4, fig. 25.

Upper Medinan (Edgewood): Thebes, Illinois; Edgewood and Louisiana, Missouri.

**ATRYPA QUADRICOSTATA** Hall. See *Hyattidina congesta*.**ATRYPA RECURVIROSTRIS** Hall. See *Zygospira recurvirostris*.**Atrypa reticularis** (Linnæus).*Anomia reticularis* Linnæus, Syst. Nat., 12th ed., 1, 1767, p. 1132.*Atrypa chemungensis* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 265.—Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 182, fig. 4.*Hipparionyx consimilaris* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 132, fig. 2.*Atrypa affinis* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 88, fig. 12.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 88, fig. 12.*Atrypa prisca* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 139, fig. 5.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 175, fig. 5; p. 198, fig. 4.—Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 1844, pl. 12, figs. 2, 10.—Billings, Canadian Nat. Geol., 1, 1856, p. 474, pl. 7, fig. 11.*Atrypa lentiformis* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 163, fig. 3, p. 164.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 215, fig. 3.*Strophomena ithacensis* Vanuxem Geol. New York, Rep. 3d Dist., 1842, p. 174, fig. 2.*Atrypa tribulis* Hall, Geol. New York, Rep. 4th Dist., 1843, p. 271, fig. 3.*Terebratula prisca* Castelnau, Essai Syst., Sil. l'Amérique Septent., 1843, p. 40, pl. 13, fig. 8.

**Atrypa reticularis**—Continued.

*Terebratula reticularis* Hall, Amer. Jour. Sci., 2d ser., 20, 1849, p. 227.—Yandell and Shumard, Cont. Geol. Kentucky, 1847, p. 10.

*Atrypa impressa* Shaler (not Hall), Bull. Mus. Comp. Zool., 4, 1865, p. 68.

*Atrypa reticularis* Hall, Pal. New York, 2, 1852, p. 72, pl. 23, fig. 8; p. 270, pl. 55, fig. 5.—Billings, Canadian Nat. Geol., 1, 1856, p. 137, pl. 2, fig. 10.—Hall, Geol. Surv. Iowa, 2, 1858, p. 515; Pal. New York, 3, 1859, p. 253, pl. 42, fig. 1.—Roemer, Sil. Fauna west. Tennessee, 1860, p. 69, pl. 5, fig. 9.—Billings, Canadian Jour., 6, 1861, p. 264, figs. 84–87; Geol. Canada, 1863, p. 318, fig. 335; p. 384, fig. 416.—Hall, Pal. New York, 4, 1867, p. 316, pl. 52, figs. 1–3, 7–12; pl. 53, figs. 3–19; pl. 53A, figs. 22, 23.—Meek, Trans. Chicago Acad. Sci., 1, 1868, p. 97, pl. 13, fig. 13.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 432, pl. 13, fig. 11.—Meek, Simpson's Rep. Expl. Great Basin Terr. Utah, 1876, p. 347, pl. 1, fig. 6.—King's U. S. Geol. Surv. Expl. 40th Parl., 4, 1877, p. 38, pl. 1, fig. 7; pl. 3, fig. 6.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 596.—Hall, 28th Rep. New York. State Mus. Nat. Hist., 1879, p. 162, pl. 25, figs. 44–47.—White, 2d Ann. Rep. Indiana Bureau Statistics and Geol., 1880, p. 502, pl. 5, figs. 7–9; 10th Rep. State Geol. Indiana, 1881, p. 134, pl. 5, figs. 7–9; 11th Rep., 1882, p. 304, pl. 25, figs. 44–47.—Whitfield, Geol. Wisconsin, 4, 1882, p. 333, pl. 26, fig. 6.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 150, pl. 14, fig. 6.—Beecher and Clarke, Mem. New York State Mus. Nat. Hist., 1, 1889, p. 51, pl. 4, figs. 12–20.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Surv., 1889, p. 91, pl. 14, figs. 12–23; pl. 15, fig. 1.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 314.—Whiteaves, Cont. Canadian Pal., 1, 1892, p. 289, pl. 37, fig. 8.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 165, fig. 153; pl. 55, figs. 1–17.—Herrick, Geol. Ohio, 7, 1895, pl. 20, fig. 7.—Davidson, Mon. British Devonian Brach. Pal. Soc., 1864, p. 53, pl. 10, figs. 3, 4.; 1867, p. 129, pl. 14, figs. 1–22; 1882, pp. 109, 110, figs.; pl. 6, figs. 14, 15; pl. 7, figs. 1–6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, pp. 57–60, figs.—Miller, N. A. Geol. Pal., 1889, pp. 336, 337, figs. 541–543.—Grabau, Bull. Buffalo Soc. Nat. Sci., 8, 1901, p. 195, fig. 112; Bull. New York State Mus., 45, 1901, p. 195, fig. 112.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 440, pl. 8, figs. 16–18.—Grabau, Michigan Geol. Surv., geol. ser. 1, 1909, p. 162, pl. 20, fig. 1.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 392, pl. 67, figs. 26–28.—Holtedahl, 2d Arct. Exp. *Fram*, 1898–1902, No. 32, 1914, p. 23, pl. 8, fig. 5.

Silurian and Devonian: World-wide distribution.

**ATRYPA RETICULARIS ARCTOSTRIATUS** Foerste. See *Atrypa arctostriata*.

**Atrypa reticularis newsomensis** Foerste.

*Atrypa reticularis newsomensis* Foerste, Jour. Geol., 11, 1903, p. 710.—Foreste, Bull. Sci. Lab. Denison Univ. 14, 1909, p. 93, pl. 1, fig. 11A, B.

Niagaran (Waldron): Newsom, etc., Tennessee.

**Atrypa reticularis niagarensis** Nettelroth.

*Atrypa reticularis* var. *niagarensis* Nettelroth, Kentucky Fossils Shells, Mem. Kentucky Geol. Surv., 1889, p. 92, pl. 32, figs. 5–8, 44–47.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 13.

Niagaran (Waldron-Louisville): Louisville, etc., Kentucky; Clarke County, Waldron, etc., Indiana; Newsom, etc., Tennessee.

*Cotypes*.—Cat. No. 51314, U.S.N.M.



*ATRYPA ROBUSTA* Hall. See *Rhynchotretra robusta*.

***Atrypa rugosa* Hall.**

*Atrypa rugosa* Hall, Pal. New York, 2, 1852, p. 271, pl. 56, fig. 1.—Hall and Clarke, *ibid.*, 8, pt. 2, 1893, p. 171.—Grabau, Bull. New York State Mus., 45, 1901, p. 196, fig. 114; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 196, fig. 114.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 310, fig. 388.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 13, pl. 2, fig. 6.

*Rhynchonella rugosa* Billings, Geol. Canada, 1863, p. 315, fig. 321.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 899, fig.

Niagaran: Lockport, etc., New York, and Ontario (Rochester); Indiana; Ohio (West Union); Kentucky; Anticosti.

*ATRYPA SEMPLICATA* Conrad. See *Camarotoechia semiplicata*.

*ATRYPA SORDIDA* Hall. See *Plectorthis (Encyclodema) sordida*.

*ATRYPA SUBTRIGONALIS* Hall. See *Rhynchotrema subtrigonale*.

*ATRYPA SULCATA* Vanuxem. See *Whitfieldella sulcata*.

*ATRYPA TRIBULIS* Hall. See *Atrypa reticularis*.

***Atrypa tubulistriata* Savage.**

*Atrypa tubulistriata* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 86, pl. 5, figs. 23 and 24.

Upper Median (Edgewood): Louisiana and mouth of Buffalo Creek, Pike County, Missouri; south of Hamburg, Illinois.

***ATRYPINA* Hall and Clarke.**

Genotype: *Leptocoelia imbricata* Hall.

*Atrypina* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 161, fig. 152; 13th Ann. Rep. New York State Geol. 1895, p. 815.—Schuchert, Zittel-Eastman Textb. Pal., 1900, p. 334; 2d ed., 1913, p. 408.

***Atrypina clintoni* Hall and Clarke.**

*Atrypina clintoni* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 162, pl. 53, figs. 7, 17–19; pl. 83, fig. 6; 48th Rep. New York State Mus., 2, 1897, p. 362, pl. 9, figs. 27–30; 14th Rep. State Geol. New York for 1894, 1897, p. 362, pl. 9, figs. 27–30.

Clinton: Orleans County, New York.

***Atrypina disparilis* (Hall).**

*Atrypa disparilis* Hall, Pal. New York, 2, 1852, p. 277, pl. 57, fig. 6.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 53, figs. 1–4.

*Leptocoelia disparilis* Hall, 12th, Rep. New York State Cab. Nat. Hist., 1859, p. 77.

*Trematospira? disparilis* Hall, 16th Rep., *ibid.*, 1863, p. 60; Trans. Albany Institute, 4, 1863, p. 146.

*Cœlospira disparilis* Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 162, pl. 25, figs. 39–43; 11th Rep. State Geol. Indiana, 1882, p. 363, pl. 25, figs. 39–43.—Beecher and Clarke, Mem. New York State Mus. Nat. Hist., 1, 1889, p. 64, pl. 5, figs. 17–23.

*Atrypina disparilis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 156.

Niagaran: Wolcott, etc., New York (Wolcott-Rochester); Waldron, Indiana; Tennessee (Waldron).

***Atrypina intermedia* (Hall).**

*Leptocoelia intermedia* Hall, Canadian Nat. Geol., 1860, 5, p. 147, fig. 5.—Dawson, Acadian Geology, 3d ed., 1878, p. 598, fig. 202.

*Atrypina intermedia* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 157 (gen. ref.).

Silurian: Arisaig, Nova Scotia.

**AULOCERIUM Parks.**Genotype: *A. savagei* Parks.*Aulocerium* Parks, Univ. Toronto Studies, Geol. Ser., 6, 1909, p. 44.***Aulocerium savagei* Parks.***Aulocerium savagei* Parks, Univ. Toronto Studies, Geol. Ser., 6, 1909, p. 44, pl. 18, figs. 13 and 15.

Niagaran: Wilmington, Illinois.

**AULOCOPELLA Rauff.**Genotype: *A. winnipegensis* Rauff.*Aulocopella* Rauff, Palæontographica, 41, 1895, p. 268.***Aulocopella winnipegensis* Rauff.***Aulocopella winnipegensis* Rauff, Palæontographica, 41, 1895, p. 269, fig. 124, pl. 24, figs. 4-6.—Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, pp. 145, 146, fig. 9, pl. 16, figs. 1-3.

Black River or Richmond: Cat Head, Lake Winnipeg, Canada.

**AULOCOPINA Billings.**Genotype: *A. granti* Billings.*Aulocopina* Billings, Canadian Nat., n. s., 7, 1874, p. 230.—Miller, N. A. Geol. Pal., 1889, p. 154.—Zittel-Eastman Textb. Pal., 1, 1900, p. 47; 2d ed., 1913, p. 53.***Aulocopina granti* Billings.***Aulocopina Granti* Billings, Canadian Nat., n. s., 7, 1874, p. 231, figs. 1, 2.—Walker, Jour. and Proc. Hamilton Assoc., 11, 1895, p. 86, fig. 2.

Niagaran dolomite: Hamilton, Ontario.

**AULOPORA Goldfuss (part). See Stomatopora Bronn.****AULOPORA Goldfuss.**Genotype: *A. serpens* Goldfuss.*Aulopora* Goldfuss, Petrefacta Germ., 1826, pp. 82, 245.—Fischer de Waldheim, Oryctographie Gouv. Moscou, 1837, p. 162.—Dana, Wilkes' U. S. Expl. Exped., 7, Zoophytes, 1842, p. 630.—McCoy, Syn. Foss. Carb. Ireland, 1844, p. 190.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 31.—Edwards and Haime, Mono. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 159, 311.—Pictet, Traite de Pal., 2d ed., 4, 1859, p. 463.—Billings, Canadian Jour., n. s., 4, 1859, p. 118.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 319.—Koninck, Animaux Foss. Terr. Carb. Belgique (Mem. l'Acad. Royale Sci. de Belgique, 39), 1872, p. 148.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 42.—Nicholson, Trans. Royal Soc. Edinburgh, 27, 1876, p. 241.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 87.—Nicholson, Tab. Corals Pal. Period, 1879, p. 219.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 518.—Hall and Simpson, Pal. New York, 6, 1887, p. xi.—Miller, N. A. Geol. Pal., 1889, p. 173.—Beecher, Trans. Connecticut Acad. Arts and Sci., 8, 1891, p. 210.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 217.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 339.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 131.—Zittel-Eastman Textb. Pal., 1, 1900, p. 101.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 78.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 116.**AULOPORA ARACHNOIDEA Hall. See Stomatopora arachnoidea.****AULOPORA CONSIMILIS Lonsdale. See Berenicea consimilis.****AULOPORA FRONDOSA James. See Proboscina frondosa.**



**Aulopora precius** Hall.

*Aulopora precius* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875 (1877), pl. 9, figs. 5, 6; Mus. ed., 1879; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 227, pl. 8, figs. 5, 6.—Roemer, *Lethæa geog.*, pt. 1, Leth. Pal., 1883, p. 521.—Davis, *Kentucky Fossil Corals*, Geol. Surv. Kentucky, pt. 2, 1885, pl. 97, fig. 20.

Niagaran: Waldron, Indiana, etc. (Waldron); Louisville, Kentucky (Louisville).

**Aulopora precius compressus** Foerste.

*Aulopora precius compressus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 339.

Upper Medinan (Brassfield): Ludlow Falls, Ohio.

**Aulopora pygmœa** Davis.

*Aulopora pygmœa* Davis, *Kentucky Fossil Corals*, Geol. Surv. Kentucky, pt. 2, 1885, pl. 73, figs. 5, 6.

Niagaran (Louisville): Near Louisville, Kentucky.

**AULOPORA REPENS** Roemer. See *Aulopora roemeri*.**Aulopora roemeri** Foerste.

*Aulopora repens* Roemer (not Knorr and Walsh, 1775), *Sil. Fauna West Tennessee*, 1860, p. 28, pl. 2, fig. 1, 1a.

*Aulopora roemeri* Foerste, Jour. Geol., 11, 1903, p. 712.

Niagaran (Brownsport): Perry and Decatur Counties, Tennessee.

**Aulopora schoharizæ** Hall.

*Aulopora schoharizæ* Hall, 26th Rep. New York State Mus., 1874, p. 110; 32d Rep. 1879, p. 142; Rep. New York State Geol. for 1882, 1883, pl. 2, figs. 1-6; Pal. New York, 6, 1887, p. 3, pl. 2, figs. 1-6.—Swartz, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 219, pl. 26, figs. 2, 3.

Helderbergian: Schoharie and Clarksville, New York (New Scotland); Hyndman, Pennsylvania (Keyser).

**Aulopora schucherti** Swartz.

*Aulopora schucherti* Swartz, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 219, pl. 26, figs. 4, 5.

Helderbergian (Keyser): Keyser, West Virginia; Cash Valley, Hancock, etc., Maryland; Hyndman, Pennsylvania.

**Aulopora serpens** Owen.

*Aulopora serpens* Owen (not Goldfuss, 1829), *Geol. Expl. Iowa, Wisconsin, and Illinois*, 2d ed., 1844, p. 78, pl. 14, fig. 2.

Niagaran: Iowa and Wisconsin.

**Aulopora(?) trentonensis** Winchell and Schuchert.

*Aulopora(?) trentonensis* Winchell and Schuchert, *Geol. Minnesota*, 3, pt. 1, 1895, p. 95, pl. G, figs. 26-28.

Black River (Decorah): Minneapolis, near Cannon Falls, etc., Minnesota.

**AULOPORA UMBELLIFERA** Billings. See *Romingeria umbellifera*.**Aulopora vancevii** Hall.

*Aulopora Vancevii* Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 255, pl. 4, figs. 1, 2.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 67, figs.

Niagaran (Louisville): Falls of the Ohio.

**AUSTINELLA** Foerste. See *Plectorthis* subgenus *Austinella*.

**AVICULA Klein.**Genotype: *A. hirundo* Klein.

*Avicula* Klein, Ostrac., 1873.—McCoy, Syn. Char. Foss., 1844, p. 82.—Woodward, Man. Mollusca, pt. 2, 1854, p. 260, pl. 16, fig. 18.—McCoy, Brit. Pal. Rocks and Foss., 1854, p. 257.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 597.—Zittel, Handb. Pal., 2, Munich, 1881, p. 32.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1881, p. 289.—Barrande, Syst. Sil. Centre Boheme, 6, 1881, p. 23.—Miller, N. A. Geol. Pal., 1889, p. 463.—Jackson, Amer. Nat., 24, 1890, p. 1141.—Koken, Die Leitfossilien, Leipzig, 1896, p. 187.

*AVICULA ALATA* Nicholson. See *Modiolopsis primigenia*.

*AVICULA AVIFORMIS* Conrad. See *Prolobella trentonensis*.

*AVICULA CARINATA* Emmons. See *Byssonychia carinata*.

*AVICULA COMMUNIS* Hall. See *Actinopteria communis*.

*AVICULA CORRUGATA* James. See *Pterinea corrugata*.

*AVICULA DANBYI* McCoy. See *Palæopecten danbyi*.

*AVICULA DEMISSA* Conrad. See *Pterinea demissa*.

*AVICULA ELLIPTICA* Hall. See *Prolobella subelliptica*.

*AVICULA EMACERATA* Conrad. See *Pterinea emacerata*.

***Avicula?? ferruginea* Conrad.**

*Avicula ferruginea* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 3, 1846, p. 23, pl. 1, fig. 28.

Silurian (iron ore): Jersey Shore, Lycoming County, Pennsylvania.

*AVICULA HERMIONE* Billings. See *Prolobella? hermione*.

*AVICULA HONEYMANI* Miller. See *Pterinea honeymani*.

*AVICULA INSUETA* Emmons. See *Pterinea insueta*.

***Avicula lamellosa* Dawson.**

*Avicula lamellosa* Dawson, Canadian Nat., n. s., 9, 1880, p. 342.

Silurian: Pictou, Nova Scotia.

*AVICULA LEPTONOTA* Hall. See *Pterinea emacerata*.

*AVICULA LIMÆFORMIS* Hall. See *Limoptera limæformis*.

*AVICULA OBSCURA* Hall. See *Pterinopecten? obscura*.

*AVICULA? ORBICULATA* Hall. See *Amphicelia orbiculoides*.

*AVICULA RHOMBOIDEA* Hall. See *Leptodesma rhomboidea*.

*AVICULA RUGOSA* Vanuxem. See *Pterinea subrugosa*.

*AVICULA SECURIFORMIS* Hall. See *Pterinea securiformis*.

*AVICULA SUBARCUATA* Emmons. See *Modiolopsis arcuata*.

*AVICULA SUBELLIPTICA* Emmons. See *Prolobella subelliptica*.

*AVICULA SUBPLANA* Hall. See *Leiopteria subplana*.

*AVICULA SUBRECTA* Hall. See *Pterinea subrecta*.



*AVICULA SUBRETROFLEXA* D'Orbigny. See *Pterinea demissa*.

*AVICULA SUBRUGOSA* D'Orbigny. See *Pterinea subrugosa*.

*AVICULA TENUILAMELLATA* Hall. See *Aviculopecten tenuilamellatus*.

*AVICULA TRENTONENSIS* Conrad. See *Prolobella trentonensis*.

*Avicula triquetra* Hall.

*Avicula triquetra* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 137, fig. 7.

Niagaran (Guelph): Newark, Wayne County, New York.

*AVICULA UNDATA* Hall. See *Pterinea undata*.

*Avicula? undosa* Ringueberg.

*Avicula undosa* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 18, pl. 2, fig. 9.

Clinton (Rochester): Lockport, New York.

*Avicula welchi* James.

Not recognized.

*Avicula welchi* James, Cincinnati Quart. Jour. Sci., 1, 1874, p. 239.

Richmond: Clinton County, Ohio.

*AVICULA WHITFIELDI* Foerste. See *Cyrtodonta? ferruginea*.

**AVICULOPECTEN** McCoy.

Genotype: *A. planoradiatus* McCoy.

*Aviculopecten* McCoy, Ann. Mag. Nat. Hist., 2d ser., 7, 1851, p. 171, fig; Contr.

British Pal., 1854, p. 203, fig.; British Pal. Rocks and Foss., 1854, p. 392.—

Meek, Amer. Jour. Sci. and Arts, 2d ser., 37, 1864, p. 217.—Meek and Hay-

den, Pal. Up. Missouri, Smiths. Cont. Knowl., 172, 14, 1865, p. 49.—Meek,

Amer. Jour. Sci. and Arts, 2d ser., 44, 1867, p. 175; 44, 1868, p. 64.—Zittel,

Handb. Pal., 2, Munich, 1881, p. 30.—Waagen, Mem. Geol. Surv. India, Pal.

Indica, 13th ser., 1, 1881, p. 300.—Barrande, Syst. Sil. du Centre Boheme, 6,

1881, p. 22; Acephales Ext. Syst. Sil. du Centre Boheme, 1881, p. 34.—Hall,

Pal. New York, 5, pt. 1, Lam. (adv. copy), 1883, p. 3; 4th Rep. State Geol.

New York, 1885, p. 47, figs. 1, 2; 1st Rep. State Geol. New York, 1884, p. 12;

Pal. New York, 5, pt. 1, Lam. 1, 1884, p. xii; 35th Rep. New York State Mus.,

1884, p. 406b.—Miller, N. A. Geol. Pal., 1889, p. 465.—Koken, Die Leitfos-

silien, Leipzig, 1896, p. 185.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899,

p. 240.—Girty, Amer. Geol., 33, 1904, pp. 291, 292, fig.; 34, 1904, p. 332.—

Hind, *ibid.*, 34, p. 200.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913,

p. 457.

*AVICULOPECTEN SUBRECTUS* Miller. See *Pterinea subrecta*.

*Aviculopecten tenuilamellatus* (Hall).

*Avicula tenuilamellata* Hall, Pal. New York, 3, 1859, p. 281, pl. 51, figs. 1 and 2.

*Aviculopecten tenuilamellatus* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 461, pl. 78, fig. 4.

Helderbergian: Albany and Schoharie Counties, New York (New Scotland); Keyser, West Virginia (Keyser).

**AZYGOGRAPTUS** Nicholson.

Genotype: *A. lapworthi* Nicholson.

*Azygograptus* Nicholson, Ann. Mag. Nat. Hist., 4th ser, 16, 1875, p. 269.—Wiman,

Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 266; Nat. Sci., 9, 1896,

p. 188.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 513.—Elles and

Wood, Mon. British Grapt. Pal. Soc., 1902, p. 92.—Ruedemann, Mem. New

York State Mus., 11, pt. 2, 1908, pp. 256-257.

**Azygograptus? simplex** Ruedemann.

*Dawsonia campanulata* Ruedemann (not Nicholson, 1873), Bull. New York State Mus., 42, 1901, p. 520.

*Azygograptus? simplex* Ruedemann, Mem. New York State Mus., 11, pt. 2, pp. 258-260, pl. 14, fig. 10, figs. 163-171.

Chazy (Normanskill): Kenwood, Glenmont, Mount Moreno, and Lansingburg, New York.

**Azygograptus? walcotti** Lapworth.

*Azygograptus? walcotti* (Lapworth) Gurley, Jour. Geol., 4, 1896, pp. 69, 92.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 257, 258, fig. 162.

Chazy (Normanskill): Stockport, New York.

**BAIRDIA ANTICOSTIENSIS** Jones. See *Krausella anticostiensis*.

**BALANOCRINITES** Troost. See *Lampterocrinus* Roemer.

**BALANOCRINUS** Hall. See *Lampterocrinus* Roemer.

**BALTOCERAS** Holm.

Genotype: *Endoceras burchardii* Dextiz.

*Baltoceras* Holm, Geol. Mag., dec. 4, 4, 1897, p. 251.—Ruedemann, Bull. New York State Mus., 90, Pal., 14, 1906, p. 432.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 517.

**Baltoceras(?) pusillum** Ruedemann.

*Baltoceras(?) pusillum* Ruedemann, Bull. New York State Mus., 90, Pal. 14, 1906, p. 431, pl. 9, fig. 4, 5.

Canadian (Beekmantown): Valcour, New York.

**BARRANDELLA** Hall and Clarke. See *Clorinda Barrande*.

**BARRANDEOCERAS** Hyatt.

Genotype: *Nautilus natator* Billings.

*Barrandeoceras* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 299.—Zittel, Handb. Pal., 2, Munich, 1884, p. 382.—Foord, Cat. Foss. Ceph. British Mus., 11, 1891, p. 77.—Hyatt, Proc. Amer. Philos. Soc., 32, 1894, p. 450.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 771.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 307.—Ruedemann, Bull. New York State Mus., 90, Pal. 14, 1906, p. 454.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 65.

**Barrandeoceras americanum** (D'Orbigny).

*Lituites convolvans* (Hisinger?) Hall, Pal. New York, 1, 1847, p. 53, pl. 13, figs. 2, 2a.

*Hortholus Americanus* D'Orbigny, Prodr. de Pal., 1, 1849, p. 1 (new name for *Lituites convolvans* Hall).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 146.

*Lituites Americanus* Miller, N. A. Geol. Pal., 1889, p. 442.

*Barrandeoceras convolvans* Hyatt, Proc. Amer. Philos. Soc., 32, 1894, p. 451.—Miller, N. A. Geol. Pal., sec. app., 1897, p. 771.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 66.

*Barrandeoceras subcostulatum* Whiteaves, Ottawa Naturalist, 12, 1898, p. 121; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 310, pl. 38.

Black River: Watertown, New York (Watertown); Wolfe Island, near Kingston, Canada.

**BARRANDEOCERAS CONVOLVANS** Hyatt. See *Barrandeoceras americanum*.

**BARRANDEOCERAS ELRODI** Milleri. See *Gyroceras elrodi*.

**Barrandeoceras minganense** Hyatt.

- Barrandeoceras minganense Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 451.—  
Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 309.  
Chazyan (Mingan): Mingan Islands, Canada.

**Barrandeoceras natator** (Billings).

- Nautilus natator Billings, Canadian Nat., 4, No. 6, 1859, p. 406.  
Phragmoceras natator Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 638,  
7 figs.  
Barrandeoceras natator Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 299  
(gen. ref.); Proc. Amer. Phil. Soc., 32, 1894, p. 452.—Whiteaves, Geol. Surv.  
Canada, Pal. Foss., 3, pt. 4, 1906, p. 308, pl. 39, figs. 1, 1a, 1b.—Grabau and  
Shimer, N. A. Index Fossils, 2, 1910, p. 66, fig. 1274.  
Chazyan: Mingan Islands, Canada (Mingan); east shore of Valcour Islands, New  
York (Valcour).

BARRANDEOCERAS SUBCOSTULATUM Whiteaves. See Barrandeoceras americanum.

**Barrandeoceras vagrans** (Billings).

- Gyroceras (Lituities) vagrans Billings, Geol. Surv. Canada Rep. Progr. for 1853-56,  
1857, p. 308.  
Barrandeoceras vagrans Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906,  
p. 311, pl. 40, figs. 1-2a.  
Black River (Leray): La Petite Chaudiere Rapids, Ottawa River, and  
Montreal, Canada.

**BARRANDEOCRINUS** Angelin.

Genotype: *B. septum* Angelin.

- Barrandeocrinus Angelin, Icon. Crin., 7, 1878, pl. 4, fig. 5, 5a; pl. 5, figs. 6, 6a;  
pl. 22, figs. 2-4.—Zittel, Handb. Pal., 1, 1879, p. 368.—Wachsmuth and  
Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 347 (Rev. Pal., pt. 3,  
p. 125); Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 484.—Bather, Treatise  
on Zool. (Lankester), pt. 3, 1900, p. 166, fig. 80.—Wachsmuth, Zittel-  
Eastman Pal., 1, 1900, p. 144.—Zittel, Grundzuge Pal., 1, 1910, p. 159.—  
Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 195.  
Cyllococrinus Miller, N. A. Geol. Pal., 1st App., 1892, p. 676; 18th Ann. Rep.  
Dep. Geol. Nat. Res. Indiana, 1894, p. 285 (adv. sheets 1892).—Bather,  
Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 156. (Genotype:  
*C. canaliculatus* Miller.)

**Barrandeocrinus canaliculatus** (Miller).

- Cyllococrinus canaliculatus Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana  
(adv. sheets, 1892, p. 31, pl. 5, figs. 13, 14), 1894, p. 285, pl. 5, figs. 13, 14;  
N. A. Geol. Pal., 1st App., 1892, p. 676, fig. 1220.  
Barrandeocrinus canaliculatus Wachsmuth and Springer, Mem. Mus. Comp.  
Zool. Harvard, 21, 1897, p. 485.  
Niagaran (Laurel): St. Paul, Indiana.

**Barrandeocrinus? indianensis** (Miller and Gurley).

- Cyllococrinus(?) indianensis Miller and Gurley, Bull. Illinois State Mus. Nat.  
Hist., 6, 1895, p. 31, pl. 4, figs. 20-22.—Miller, N. A. Geol. Pal., 2d App., 1897,  
p. 741, fig. 1331.  
Niagaran (Laurel): St. Paul, Indiana.

BARRANDIA? MCCOYI Walcott. See Dolichometopus mccoysi.



**BARYPHYLLUM** Edwards and Haime.Genotype: *B. verneuleanum* Edwards and Haime.

*Baryphyllum* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 165, 352.—Pictet, *Traité de Pal.*, 4, 1857, p. 453.—Milne-Edwards, *Hist. Nat. d. Corall.*, 3, 1860, p. 355.—Ludwig, *Palæontographica*, 14, 1865, p. 143, pl. 31, figs. 11, 11a.—Dybowski, *Archiv f. Natur. Liv., Ehst- und Kurl.*, 5, 1873, p. 334.—Zittel, *Handb. Pal.*, 1, Munich, 1879, p. 227.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883, p. 372.—Miller, *N. A. Geol. Pal.*, 1889, p. 174.—Sherzer, *Amer. Geol.*, 7, 1891, pp. 278–283.

**Baryphyllum fungulus** White.

*Baryphyllum fungulus* White, *Proc. Acad. Nat. Sci. Philadelphia*, 1878, p. 29. Niagaran (Waldron) Waldron, Indiana.

**BASILICUS** Salter.Genotype: *Asaphus tyrannus* Murchison.

*Basilicus* Salter, *Mem. Geol. Surv. United Kingdom*, dec. 2, 1849, pl. 5.—McCoy, *Ann. Mag. Nat. Hist.* (2), 4, 1849, p. 399; *Brit. Pal. Rocks and Fossils*, 1854, p. 169.—Salter, *Mon. Brit. Tril.*, *Pal. Soc.*, 1866, p. 146.—Zittel, *Handb. Pal.*, 2, 1885, p. 608.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 26.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 8th ser., 6, 1898, p. 29; 12, No. 8, 1901, p. 1; 14, No. 10, 1904, pp. 3–20.—Raymond, *Ann. Carnegie Mus.*, 7, No. 1, 1910, p. 62; *Trans. and Proc. Roy. Soc. Canada*, 5, 3d ser., sec. 4, 1912, p. 115; *Zittel-Eastman Textb. Pal.*, 1913, p. 719.

**Basilicus barrandi** (Hall).

*Asaphus Barrandi* Hall, *Geol. Lake Superior Land Dist.*, Foster and Whitney's Rep., 1851, p. 210, pl. 27, figs. 1a–d; pl. 28; *Rep. Geol. Surv. Wisconsin*, 1862, p. 41, fig. 4.

*Ogygia barrandii* Whitfield, *Amer. Mus. Nat. Hist.*, 2, pt. 1, 1898, p. 70.

*Asaphus Romingeri* Walcott, 28th Rep. New York State Mus. *Nat. Hist.*, doc. ed., 1877, p. 96; *mus. ed.*, 1879, p. 96.

*Ptychopyge romingeri* Clarke, *Geol. Minnesota*, 3, pt. 2, 1897, p. 709.

*Basilicus romingeri* Raymond, *Ann. Carnegie Mus.*, 7, No. 1, 1910, p. 49, pl. 15, figs. 9, 10; pl. 16, figs. 1–4.

*Asaphus Wisconsinensis* Walcott, 28th Rep. New York State Mus. *Nat. Hist.*, doc. ed., 1877, p. 97; *mus. ed.*, 1879, p. 97.

*Ptychopyge ulrichi* Clarke, *Geol. Minnesota*, 3, pt. 2, 1897, p. 709, figs. 12, 13.

*Asaphus ulrichi* Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 786 (gen. ref.).

*Basilicus barrandi* Raymond, *Bull. Victoria Mem. Mus.*, 1, 1913, p. 42; *Bull. Mus. Comp. Zool.*, 58, 1914, p. 261, pl. 1, figs. 4, 5; pl. 2, figs. 1, 7.

Black River: Platteville, etc., Wisconsin; Russia, Herkimer County, New York; Cannon Falls and Faribault, Minnesota; Ottawa, Ontario; St. Joseph's Island, Lake Huron.

**BASILICUS CANADENSIS** Chapman. See *Ogygites canadensis*.

**Basilicus huttoni** (Billings).

*Asaphus Huttoni* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 271, fig. 256.

*Ptychopyge huttoni* Clarke, *Geol. Minnesota*, 3, pt. 2, 1894, p. 710.

*Asaphus morrisii* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 272, fig. 257.—Vogdes, *Bull. U. S. Geol. Surv.*, 63, 1890, pp. 93, 94.

Chazy (Quebec—N, P): Tablehead and four miles northeast Portland Creek, Newfoundland.

**Basilicus marginalis** (Hall).

*Asaphus marginalis* Hall, *Pal. New York*, 1, 1847, p. 24, pl. 4 (bis.), fig. 15.—Emmons, *Amer. Geol.*, 1, pt. 2, 1855, p. 235, pl. 3, fig. 16.—Raymond, *Ann. Carnegie Mus.*, 3, 1905, p. 339, pl. 10, figs. 17–20; pl. 11.—Grabau and Shimer, *N. A. Index Foss.*, 2, 1910, p. 291, fig. 1599.

**Basiliscus marginalis**—Continued.

*Basiliscus marginalis* Raymond, 7th Rep. State Geol. Vermont, 1910, p. 220, pl. 32, figs. 17–20; pl. 34, figs. 8–10; pl. 37, fig. 6; pl. 39, figs. 1–2; Ann. Carnegie Mus., 7, No. 1, 1910, p. 62, fig. 1; pl. 17, fig. 6; pl. 19, figs. 1, 2.

*Asaphus alpha* Raymond, Ann. Carnegie Mus., 3, 1905, p. 342, pl. 12, fig. 9.

*Asaphus gamma* Raymond, Ann. Carnegie Mus., 3, 1905, p. 342, pl. 12, fig. 10.

Chazy (Day Point, Crown Point): Chazy, Valcour Island, etc., New York.

Observation.—See also *Gerasaphes ulrichana* Ruedemann (not Clarke) for a possible synonym.

**Basiliscus? vetustus** (Hall).

*Ogygia? vetusta* Hall, Pal. New York, 1, 1847, p. 227, pl. 60, fig. 1.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 216, fig. 72.

*Asaphus vetustus* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 72 (gen. ref.).

Black River (Lowville): Mohawk Valley, New York.

**BATHYCELLA** Foerste. See *Pianodema* Foerste.

**BATHYURELLUS** Billings.

Genotype: *Bathyurellus abruptus* Billings.

*Bathyurellus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 262, 263.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 94, footnote; mus. ed., 1879.—Dames, Richthofen's China, Berlin, 4, 1883, p. 5.—Zittel, Handb. Pal., 2, 1885, p. 602.—Miller, N. A. Geol. Pal., 1889, p. 533.—Raymond, Ann. Carnegie Mus., 3, No. 2, 1905, p. 337; Zittel-Eastman Textb. Pal., 1913, p. 718.

**Bathyurellus abruptus** Billings.

*Bathyurellus abruptus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 263, fig. 247 (?250).

Canadian (Quebec—F, G, H): Port aux Choix and Keppel Island, Newfoundland.

**Bathyurellus brevispinus** Raymond.

*Bathyurellus brevispinus* Raymond, Ann. Carnegie Mus., 3, 1905, p. 337, pl. 10, figs. 13–15; 7th Rep. State Geol. Vermont, 1910, p. 218, pl. 32, figs. 13–15.

Chazy: Three miles east of Chazy, New York (Day Point); Mingan Islands, Canada (Mingan).

**Bathyurellus expansus** Billings.

*Bathyurellus expansus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 318, fig. 306a, b.

Canadian (Beekmantown): Stanbridge, Quebec.

**Bathyurellus formosus** Billings.

*Bathyurellus formosus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 206, fig. 250.

Chazy (Quebec—P): Cow Head, Newfoundland.

Observation.—Compare *Bathyurellus brevispinus* Raymond.

**Bathyurellus fraternus** Billings.

*Bathyurellus fraternus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 267, fig. 251, a, b.

Chazy: Cow Head, Newfoundland (Quebec—P); Mingan Islands, Canada (Mingan).

**Bathyurellus litoreus** Billings.

*Bathyurellus litoreus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 320.

Ozarkian? (Levis-erratic): Point Levis, Quebec.



**Bathyurellus marginatus** Billings.

*Bathyurellus marginatus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 264, fig. 248 (?249).

Canadian (Quebec—F, G, H): Keppel Island, Port aux Choix, and Table Head, Newfoundland.

**Bathyurellus minor** Raymond.

*Bathyurellus minor* Raymond, Annals Carnegie Mus., 3, 1905, p. 338, pl. 10, fig. 16; 7th Rep. State Geol. Vermont, 1910, p. 219, pl. 32, fig. 16.

*Bathyurellus validus* Raymond, Bull. Amer. Pal., 3, No. 14, 1902, p. 301.

Chazyan (Crown Point): Crown Point, Valcour Island, New York.

**Bathyurellus nitidus** Billings.

*Bathyurellus nitidus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 265, fig. 249.—Miller, N. A. Geol. Pal., 1889, p. 533, fig. 971.

Chazyan (Quebec—P): Cow Head, Newfoundland.

**Bathyurellus rarus** Billings.

*Bathyurellus rarus* Billings, Pal. Foss., 1, Geol. Surv., Canada, 1865, p. 320.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

**Bathyurellus validus** Billings.

*Bathyurellus validus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 268, fig. 252. Chazyan (Quebec—L): Point Rich, Newfoundland.

**BATHYURUS** Billings.

Genotype: *Asaphus extans* Hall.

*Bathyrus* Billings, Canadian Nat. Geol., 4, 1859, p. 364; 5, 1860, p. 317; Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 408, 409.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 94; mus. ed., 1879.—Kayser, Beitr. Geol. and Pal. Argentinischen Republik, Palæontographica Suppl., 3, 1876, p. 10.—Dames, Richthofen's China, 4, 1883, p. 4.—Zittel, Handb. Pal., 2, 1885, p. 602.—Miller, N. A. Geol. Pal., 1889, p. 533.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 718; Bull. Victoria Mem. Mus., 1, 1913, p. 51.

**Bathyrus acutus** Raymond.

*Bathyrus acutus* Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 56, pl. 7, fig. 4. Stones River (Pamelia): Westboro, near Ottawa, Ontario.

**Bathyrus amplimarginatus** Billings.

*Bathyrus amplimarginatus* Billings, Canadian Nat. Geol., 4, 1859, p. 365, fig. 12a, b; Geol. Canada, Geol. Surv. Canada, 1863, p. 122, fig. 41; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 353, fig. 341a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 54.

*Bathyrus minganensis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 353. Canadian: Mingan Islands, Canada (Romaine); Rockland, Ontario, (Beekmantown).

**Bathyrus angelini** Billings.

*Bathyrus Angelini* Billings, Canadian Nat. Geol., 4, 1859, p. 467, fig. 37; Geol. Canada, Geol. Surv. Canada, 1863, p. 133, fig. 68.—Chapman, Canadian Jour., n. s., 8, 1863, p. 29, fig. 142; p. 195, fig. 166; Expos. Min. Geol. Canada, 1864, p. 137, fig. 142; p. 167, fig. 166.—Raymond, Ann. Carnegie Mus., 3, 1905, No. 2, p. 335, fig. 1, pl. 10, figs. 11, 12; 7th Rep. State Geol. Vermont, 1910, pl. 32, figs. 11, 12; Bull. Victoria Mem. Mus., 1, 1913, p. 55, pl. 7, fig. 5.

Canadian: Grenville (Beekmantown), Mingan Islands (Romaine), etc., Canada.



**Bathyurus arcuatus** Billings.

*Bathyurus arcuatus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 205, figs. 189, 190.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 57.

Canadian (Beekmantown): Near St. Antoine, above Quebec, Canada.

**BATHYURUS ARMATUS** Billings. See *Plethopeltis armatus*.

**BATHYURUS ARMATUS** Walcott. See *Plethopeltis saratogensis*.

**BATHYURUS BITUBERCULATUS** Billings. See *Lloydia bituberculatus*.

**BATHYURUS BREVICEPS** Billings. See *Leiostegium breviceps*.

**BATHYURUS CAPAX** Billings. See *Platycolpus capax*.

**BATHYURUS CAUDATUS** Billings. See *Goniurus caudatus*.

**BATHYURUS CONGENERIS** Walcott. See *Holasaphus congeneris*.

**BATHYURUS CONICUS** Billings. See *Hystericurus conicus*.

**BATHYURUS CORDAI** Billings. See *Hystericurus cordai*.

**BATHYURUS CROTALIFRONS** Dwight. See *Hystericurus crotalifrons*.

**BATHYURUS CYBELE** Billings. See *Petigurus cybele*.

**Bathyurus?? darwini** Kayser.

*Bathyurus? Darwinii* Kayser, Beitr. Geol. Pal. Argentinischen Republik, Paläontographica Suppl., 3, 1876, p. 12, pl. 2, fig. 6.

Ordovician: Quebrada de Juan Pobre, Argentina.

**BATHYURUS DUBIUS** Billings. See *Platycolpus dubius*.

**BATHYURUS ELLIPTICUS** Cleland. See *Petigurus ellipticus*.

**Bathyurus extans** (Hall).

*Asaphus? extans* Hall, Pal. New York, 1, 1847, p. 228, pl. 60, figs. 2, 2a-c; 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 182, pl. 3, fig. 1 (doc. ed., p. 174).—Emmons, Amer. Geology 1, pt. 2, 1855, pl. 15, figs. 8, 11.

*Asaphus? nodostriatus* Hall, Pal. New York, 1, 1847, p. 248, pl. 61, figs. 1a, b.

*Bathyurus extans* Billings, Canadian Nat. Geol., 4, 1859, p. 364; Geol. Canada, Geol. Surv. Canada, 1863, p. 153, fig. 114.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 722, fig. 37.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288, fig. 1594.—Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 46, pl. 15, figs. 7, 8; pl. 16, fig. 5; Bull. Victoria Mem. Mus., 1, 1913, p. 52.

Black River: Mohawk Valley, near Watertown, etc., New York; Ottawa and Mingan Islands, Canada; Minnesota, Wisconsin, Kentucky.

**Bathyurus glandicephalus** Whitfield.

*Bathyurus (Bathyurellus) glandicephalus* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 38, pl. 2, figs. 9-12.

*Bathyurus glandicephalus* Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 55.

Canadian (Beekmantown): Shoreham, Vermont; Champlain Valley.

**Bathyurus ingalli** Raymond.

*Bathyurus ingalli* Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 57, pl. 7, fig. 7. Trenton (Curdsville): Two miles north Kirkfield, Belleville, and near Ottawa, Ontario.

**Bathyurus johnstoni** Raymond.

*Bathyurus johnstoni* Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 53, pl. 7, figs. 2, 3.

Black River (Lowville): Carden, Ottawa, and west of Mechanicsville, Ontario.

**Bathyurus? lajensis** Kayser.

*Bathyurus? lajensis* Kayser, Beitr. Geol. and Pal. Argentinischen Republik, Palæontographical Suppl. 3, 1876, p. 12, pl. 2, fig. 5.

Ordovician: Quebrada de la Laja, Argentina.

**BATHYURUS LEVIS** Cleland. See *Symphysurus convexus*.

**Bathyurus longispinus** Walcott.

*Bathyurus longispinus* Walcott, 28th Ann. Rep. New York State Mus., 1879, p. 94.—Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 47, pl. 16, figs. 12-14; Zittel-Eastman Textb. Pal., 1913, p. 718, fig. 1381; Bull. Victoria Mem. Mus., 1, 1913, p. 54.

*Ptychopyge jerseyensis* Weller, Pal. New Jersey, 3, 1903, p. 193, pl. 14, fig. 16.

Black River: Newport, New York; Jacksonburg, New Jersey.

**BATHYURUS MINGANENSIS** Billings. See *Bathyurus amplimarginatus*.

**BATHYURUS NERO** Billings. See *Petigurus nero*.

**BATHYURUS OBLONGUS** Billings. See *Lloydia oblongus*.

**Bathyurus? orbignyanus** Kayser.

*Bathyurus? Orbignyanus* Kayser, Beitr. Geol. and Pal. Argentinischen Republik, Palæontographical Suppl. 3, 1876, p. 12, pl. 2, figs. 7, 8.

Ordovician: Quebrada de Juan Pobre, Argentina.

**Bathyurus perkinsi** Whitfield.

*Bathyurus perkinsi* Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 183, pl. 5, figs. 7, 8.—Seely, 7th Rep. State Geol. Vermont, 1910, pl. 55, figs. 7, 8.

Canadian (Beekmantown): Mouth of Otter Creek, Vermont.

**Bathyurus perplexus** Billings.

*Bathyurus perplexus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 364, fig. 350.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 52.

Middle Ordovician? Bonne Bay, Newfoundland.

Observation.—Probably the same as *B. extans*.

**BATHYURUS PERSPICATOR** Billings. See *Goniurus perspicator*.

**Bathyurus pogonipensis** Hall and Whitfield.

*Bathyurus Pogonipensis* Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 243, pl. 1, figs. 33, 34.

Lower Pogonip: West side Pogonip Mountain, White Pine District, Nevada.

*Holotype*.—Cat. No. 24655, U.S.N.M.

**BATHYURUS QUADRATUS** Billings. See *Leiostiegium quadratus*.

**BATHYURUS SAFFORDI** Billings. See *Lloydia saffordi*.

**Bathyurus schucherti** Clarke.

*Bathyurus schucherti* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 724, figs. 41, 42.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 58.

Black River (Platteville): Minneapolis, Minnesota.

*Cotype*.—Cat. No. 43052, U.S.N.M.

**BATHYURUS SEELYI** Whitfield. See *Bolbocephalus seelyi* and *Hystricurus cordai*.

**Bathyrurus(?) simillimus** Walcott.

*Bathyrurus?* *simillimus* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 93, pl. 12, fig. 11.

Upper Pogonip: White Mountain, Eureka District, Nevada.

*Holotype*: Cat. No. 24653, U.S.N.M.

**BATHYURUS SMITHI** Billings. See *Haploconus smithi*.

**BATHYURUS SOLITARIUS** Billings. See *Lloydia solitarius*.

**Bathyrurus spiniger** (Hall).

*Acidaspis spiniger* Hall, Pal. New York, 1, 1847, p. 241, pl. 64, fig. 5.

*Bathyrurus spiniger* Clarke, Geol. Minnesota, 3, pt. 2, 1884, p. 723, figs. 38-40.—Raymond, Bull. Amer. Pal., 3, 1902, pl. 19, figs. 1-3; Ann. Carnegie Mus., 7, 1910, p. 48, pl. 15, figs. 4-6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 57.

Black River: Mohawk Valley, New York; Montreal, Quebec; Illinois, Kentucky, Missouri, Iowa.

*Plesiotype*.—Cat. Nos. 41932, 41933, U. S.N.M.

**BATHYURUS STONEMANI** Vogdes. See *Proetus stonemani*.

**BATHYURUS STRENUUS** Billings. See *Lloydia strenuus*.

**Bathyrurus superbus** Raymond.

*Bathyrurus superbus* Raymond, Ottawa Nat., 24, 1910, p. 129, pl. 2, figs. 1-3; Bull. Victoria Mem. Mus., 1, 1913, p. 54.

Black River: Near Ottawa, Ontario.

**Bathyrurus? taurifrons** Dwight.

*Bathyrurus taurifrons* Dwight, Amer. Jour. Sci., 3d ser., 27, 1884, p. 252, pl. 7, figs. 1, 1a-3.

Canadian (Beekmantown): Rochdale County, New York.

**Bathyrurus? timon** Billings.

*Bathyrurus Timon* Billings, Pal. Foss., 1, Geol. Surv. Canada, p. 261, fig. 244.

Canadian (Quebec-G, H): Port aux Choix, Newfoundland.

**BATHYURUS TUBERCULATUS** Walcott. See *Hystricurus tuberculatus*.

**Bathyrurus? vetulus** Billings.

*Bathyrurus vetulus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 365.

Middle Ordovician: East arm of Bonne Bay, Newfoundland.

**BATOSTOMA? Ulrich.**

Genotype: *Monticulipora* (*Heterotrypa*) *implicata* Nicholson.

*Batostoma* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154.—Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 17.—Miller, N. A. Geol. Pal., 1889, p. 294.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 379, 459; Geol. Minnesota, 3, 1893, p. 288; Zittel's Textb. Pal. (Engl. ed.), 1897, p. 275.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 35.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 136.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 740.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 272; Zittel-Eastman Textb. Pal., 1913, p. 338.



**Batostoma canadense** (Foord).

Amplexopora Canadensis Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 17, pl. 4, figs. 2-2d.

Batostoma Canadensis Ulrich, Geol. Minnesota, 3, 1893, p. 317.

Mohawkian: St. Joseph Island, Lake Huron (Black River); Joliette, Quebec (?Trenton).

**Batostoma? decipiens** Ulrich.

Batostoma? decipiens Ulrich, Geol. Minnesota, 3, 1893, p. 298, pl. 27, figs. 16-19. Black River (Decorah): Minneapolis, Minnesota.

*Holotype*.—Cat. No. 43511, U.S.N.M.

**Batostoma fertile** Ulrich.

Batostoma fertilis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 92; Geol. Minnesota, 3, 1893, p. 290, pl. 25, figs. 1-11; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275, fig. 459A.—Sardeson, Jour. Geol., 9, 1901, p. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 136, fig. 188k, 1901.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 274, 275, fig. 163.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Echinospherites limestone): Near Reval, Esthonia, Russia.

*Cotypes*.—Cat. No. 43505, U.S.N.M.

**Batostoma fertile circulare** Ulrich.

Batostoma fertile var. circulare Ulrich, Geol. Minnesota, 3, 1893, p. 291, pl. 25, figs. 8, 9—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 275, 276, fig. 164; Zittel-Eastman Textb. Pal., 1913, p. 338, fig. 492b.

Batostoma fertile Ulrich, Zittel's Textb. Pal. (Eng. ed.), 1896, p. 275, fig. 459B.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Echinosphaerites limestone): Near Reval, Esthonia, Russia.

*Holotype*.—Cat. No. 43506, U.S.N.M.

**Batostoma humile** Ulrich.

Batostoma humile Ulrich, Geol. Minnesota, 3, 1893, p. 294, pl. 25, figs. 29-36.

Trenton (Prosser): St. Paul and Cannon Falls, Minnesota; Decorah, Iowa.

*Cotypes*.—Cat. No. 43509, U.S.N.M.

**BATOSTOMA IMPERFECTUM** Ulrich. See Hemiphragma imperfectum.

**Batostoma implicatum** (Nicholson).

Chaetetes implicata Ulrich, Cat. Foss. Cincinnati Group, 1880, p. 12 (not defined).

Monticulipora (Heterotrypa) implicata Nicholson, Genus Monticulipora, 1881, p. 147, pl. 2, figs. 7, 7e.

Monticulipora implicatum J. F. James, Jour. Cincinnati Soc. Hist., 16, 1894, p. 198.

Batostoma implicatum Ulrich, *ibid.*, 5, 1882, p. 256; 7, 1883, p. 83.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 178.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 48, pl. 2, fig. 6.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 774, pl. 7, fig. 7; pl. 8, fig. 2.

Alecto nexilis James, Intr. Cat. Foss. Cincinnati Group, 1875, p. 3.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 10.

Ceramopora? irregularis James, Paleontologist, No. 1, 1878, p. 5 (part).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 26.

Eden: Cincinnati, Ohio, and vicinity.

**BATOSTOMA IRRASA** Ulrich. See Hemiphragma irrasum.

**Batostoma jamesi** (Nicholson).

Chaetetes Jamesi Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 506, pl. 29, figs. 10, 10b; Pal. Ohio, 2, 1875, p. 200, pl. 21, figs. 11, 11a; Ann Mag.

Nat. Hist., 4th. ser., 18, 1876, p. 89.

**Batostoma jamesi**—Continued.

*Monticulipora Jamesi* Nicholson, Ann. Mag. Nat. Hist., 5th ser., 6, 1880, p. 415, fig. 3A, B, fig. 4.—(Van Cleve) Hall, 12th Rep. Indiana Geol. Nat. Hist., 1883, p. 248, pl. 11, fig. 8.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 176.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 421, figs.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 197.

*Monticulipora* (*Heterotrypa*) *Jamesi* Nicholson, Genus *Monticulipora*, 1881, p. 143, figs. 25, 26.

*Batostoma jamesi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 256; 6, 1883, p. 83.—Miller, N. A. Geol. Pal., 1889, p. 294, fig. 457.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 775, pl. 7, figs. 8, 8a; pl. 8, fig. 1, pl. 27, figs. 6, 6a. \*

*Ceramopora*? *irregularis* James, Paleontologist, No. 1, 1878, p. 5 (part).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 26.

*Eridotrypa vevayensis* Cumings, Amer. Geol., 28, 1901, p. 376, pl. 35, figs. 7, 8. Eden: Cincinnati, Ohio, and vicinity.

Observation.—The type specimen of *Eridotrypa vevayensis* was found to be an example of *Batostoma jamesi* in which the mesopores were fewer than usual, thus making the zoecia more angular. *Ceramopora irregularis* James was based on incrusting forms of both *Batostoma jamesi* and *B. implicatum*.

**Batostoma libana** (Safford).

*Stenopora libana* Safford, Geol. Tennessee, 1869, p. 285.

Stones River (Lebanon): Lebanon, Tennessee.

Observation.—Although not sufficiently described for recognition, this species is known to be a characteristic fossil of the Lebanon limestone.

**Batostoma magnopora** Ulrich.

*Batostoma magnopora* Ulrich, Geol. Minnesota, 3, 1893, p. 291, pl. 25, figs. 12–15.—

Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 272–274, figs. 161, 162.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Wassaleum): Uxnorm, Esthonia, Russia.

*Cotypes* and *plesiotype*.—Cat. Nos. 43508, 57377, U.S.N.M.

**Batostoma manitobense** Ulrich.

*Batostoma Manitobense* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 33; pl. 9, figs. 3–3c.—Whiteaves, Pal. Foss., 3, 1895, p. 117.

Richmond (Stony Mountain): Stony Mountain, Manitoba; Wyoming.

Sections of *cotypes*.—Cat. No. 43250, U.S.N.M.

**Batostoma maysvillense** Nickles.

*Batostoma maysvillensis* Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 51, pl. 2, figs. 13, 14.

Maysville (Mount Hope): Near Maysville, Kentucky.

**Batostoma minnesotense** Ulrich.

*Amplexopora superba* Ulrich (not Foord), 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 92.

*Batostoma minnesotense* Ulrich, Geol. Minnesota, 3, 1893, p. 297, pl. 26, figs. 38–40, pl. 27, figs. 9–15.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588, fig. 173.

Black River (Decorah): Minneapolis, St. Paul, etc., Minnesota.

*Cotypes*.—Cat. No. 43507, U.S.N.M.

**Batostoma montuosum** Ulrich.

*Batostoma montuosum* Ulrich, Geol. Minnesota, 3, 1893, p. 293, pl. 25, figs. 26–28.

Black River (Decorah): Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 45312, U.S.N.M.

*BATOSTOMA OTTAWAENSE* Foord. See *Hemiphragma ottawaense*.

***Batostoma prosseri* Cumings and Galloway.**

*Batostoma prosseri* Cumings and Galloway, Proc. Indiana Acad. Sci., 1912, p. 151, pl. 5, figs. 1-1c; pl. 6, figs. 1-1d; pl. 7, figs. 2-2c.

Richmond (Upper Waynesville and Lower Liberty): Weisburg, Indiana.

***Batostoma? rugosum* (Whitfield).**

*Fistulipora rugosa* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1879, 1880, p. 60; Geol. Surv. Wisconsin, 4, 1882, p. 255, pl. 11, figs. 20, 21.

*Batostoma rugosum* Miller, N. A. Geol. Pal., 1889, p. 294.

Richmond (Maquoketa): Delafield, Wisconsin.

***Batostoma sevieri* Bassler.**

*Batostoma sevieri* Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 21, figs. 1-3 Chazyan (Ottosee): Speer Ferry, Virginia; Knoxville, Tennessee, etc.

*Cotypes*.—Cat. No. 56630, U.S.N.M.

***Batostoma superbum* (Foord).**

*Amplexopora superba* Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 16, pl. 4, figs. 1-1c.

*Batostoma superbum* Ulrich, Geol. Minnesota, 3, 1893, p. 297.

Trenton: Montreal, Quebec.

*BATOSTOMA (HEMIPHGRAMMA) TENUIMURALE* Grabau and Shimer. See *Hemiphragma tenuimurale*.

*BATOSTOMA VARIABLE* (part) Ulrich. See *Batostoma varians*.

***Batostoma variable* Ulrich.**

*Batostoma variable* Ulrich (part), Geol. Surv. Illinois, 8, 1890, p. 460, pl. 35, fig. 5; pl. 36, fig. 1 (not pl. 35, figs. 4b, c=B. varians).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 18, pl. 7, figs. 9, 10.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 777, pl. 8, fig. 4; pl. 26, fig. 13.—Cumings and Galloway, Proc. Indiana Acad. Sci., 1912, p. 150, pl. 2, figs. 1-1c; pl. 3, figs. 1-1c; pl. 4, figs. 1, 1a, pl. 7, figs. 1-1c.

Richmond (Whitewater): Versailles, Richmond, etc., Indiana; Ohio.

*Cotypes and plesiotype*.—Cat. Nos. 43820, 44777, U.S.N.M.

***Batostoma varians* (James).**

*Chaetetes varians* James, Paleontologist, No. 1, 1878, p. 2.

*Monticulipora (Chaetetes) varians* James, Paleontologist, No. 5, 1881, p. 36.

*Monticulipora varians* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 177, pl. 2, figs. 4a, b.—J. F. James, *ibid.*, 16, 1894, p. 199.

*Batostoma variabile* (part) Ulrich, Geol. Surv. Illinois, 8, 1890, p. 460, pl. 35, figs. 4b-c, (Not 4, 4a, 5, or pl. xxxvi, pt. 1=B. variabile).—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 200.

*Batostoma varians* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 179.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 57, pl. 3, figs. 8, 9.—Bassler Proc. U. S. Nat. Mus., 30, 1906, p. 18.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 778, pl. 7, fig. 9; pl. 8, figs. 3, 3b; pl. 26, fig. 14.—Cumings and Galloway, Proc. Indiana Acad. Sci., 1912, p. 148, pl. 1, figs. 1-1e; pl. 7, figs. 3, 3a.

Richmond: Blanchester, Clarksville, etc., Ohio; Richmond, Versailles, etc., Indiana (Arnheim-Liberty); Savannah, Illinois, and Delafield, Wisconsin (Maquoketa).



**Batostoma varium** Ulrich.

- Batostoma varium* Ulrich, Geol. Minnesota, 3, 1893, p. 292, pl. 25, figs. 16-25.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588, fig. 175 (not fig. 176=*Eridotrypa mutabilis*).  
 Black River (Decorah): Minneapolis and St. Paul, Minnesota.  
 Chazy (Mingan): Mingan Islands, Canada.  
*Cotypes*.—Cat. No. 43510, U.S.N.M.

**BATOSTOMA (HEMIPHAGMA) WHITFIELDI** Grabau and Shimer. See *Hemiphagma whitfieldi*.

**Batostoma winchelli** (Ulrich).

- Amplexopora winchelli* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 91.  
*Batostoma winchelli* Ulrich, Geol. Minnesota, 3, 1893, 295, pl. 26, figs. 33-37, pl. 27, figs. 1-6.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588, fig. 174.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 136, fig. 188j, 190j.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 278, 279, fig. 166.  
 Black River (Decorah): Minneapolis, Minnesota, and vicinity; Lake Nipissing, Ontario.  
 Ordovician (Wesenberg): Wesenberg, Esthonia, Russia.  
*Cotypes*.—Cat. No. 43815, U.S.N.M.

**Batostoma winchelli nodosum** Ulrich.

- Batostoma winchelli* var. *nodosum* Ulrich, Geol. Minnesota, 3, 1893, p. 295, pl. 26, fig. 35.  
 Black River (Decorah): Minneapolis and St. Paul, Minnesota.

**Batostoma winchelli spinulosum** Ulrich.

- Batostoma winchelli* var. *spinulosum* Ulrich, Geol. Minnesota, 3, 1893, p. 296, pl. 27, figs. 7, 8; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275, fig. 459C.—Bassler, Bull. U. S. Nat. Mus. 77, 1911, pp. 279-280, figs. 167, 168.  
 Black River (Decorah): Minneapolis and St. Paul, Minnesota.  
 Ordovician (Wassale): Uxnorm, Esthonia, Russia.  
*Plesiotype*.—Cat. No. 57383 U.S.N.M.

**BATOSTOMELLA** Ulrich.

Genotype: *B. spinulosa* Ulrich.

- Batostomella* Ulrich (in part), Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 141, 154.—Miller, N. A. Geol. Pal., 1889, p. 294.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 375, 432.—Rominger, Amer. Geol., 6, 1890, p. 119.—Whidborne, Devon. Fauna England, Pal. Soc., 2, 1895, pt. 4, p. 187.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 277.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 32, 180.—Grabau, Bull. New York State Mus., 45, 1901, p. 164; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 164.—Condra, Nebraska Geol. Surv., 2, pt. 1, 1903, p. 38.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 28.—Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 133.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 335.  
*Geinitzella* Waagen and Wentzel, Pal. Indica, ser., 13, 1886, pp. 875, 880.—Zittel, Textb. Pal. (Engl. ed.), 1896, p. 105.

**BATOSTOMELLA** (part) Ulrich. See *Eridotrypa* Ulrich.

**BATOSTOMELLA ANNULIFERA** Ulrich. See *Lioclemella annulifera*.

**BATOSTOMELLA? ASPERA** Nickles and Bassler. See *Acanthoclema asperum*.

**BATOSTOMELLA GRACILIS** Ulrich. See *Bythopora gracilis*.

**Batostomella granulifera** (Hall).

*Trematopora granulifera* Hall, Pal. New York, 2, 1852, p. 154, pl. 40 A, figs. 9a-e; \*28th Ann. Rep. New York State Mus. (doc. ed.), 1876, pl. 11, figs. 6, 7; (mus. ed.), 1879, p. 112, pl. 11, figs. 6, 7; \*11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 233, pl. 10, figs. 6, 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1200, figs.

*Rhombopora granulifera* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 647.

*Batostomella granulifera* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 180 (gen. ref.).—Grabau, Bull. New York State Mus., 45, 1901, p. 164, fig. 61.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 28, 29, pl. 13, figs. 1-5; pl. 24, figs. 10, 11; pl. 25, figs. 11, 12.—\*Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 133.

Clinton: Lockport, Rochester, Middleport, etc., New York; Grimsby, Hamilton, and Thorold, Ontario (Rochester); Osgood, Indiana (Osgood).

Niagaran (Waldron): Waldron, Indiana.

*Plesiotypes*.—Cat. No. 35517, U.S.N.M.

Observation.—The citations preceded by the (\*) refer to the Waldron form, which may be specifically distinct.

**BATOSTOMELLA GRANULIFERA** Ulrich. See *Homotrypella granulifera*.

**Batostomella interporosa** Ulrich and Bassler.

*Batostomella interporosa* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 270, pl. 45, figs. 1, 2; pl. 48, fig. 5.

Helderbergian (Keyser): Devils Backbone, near Cumberland, Maryland.

*Cotypes*.—Cat. No. 53761, U.S.N.M.

**BATOSTOMELLA SIMULATRIX** Ulrich. See *Eridotrypa simulatrix*.

**BATTUS PISIFORMIS** Dalman. See *Agnostus pisiformis*.

**BATTUS PUSILLUS** Sars. See *Shumardia pusilla*.

**BATTUS TUBERCULATUS** Kloeden. See *Beyrichia tuberculata*.

**BEATRICEA** Billings.

Genotype: *B. nodulosa* Billings.

*Beatricea* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-6, 1857, p. 343; Canadian Jour., n. s., 3, 1858, p. 331; Canadian Nat. Geol., n. s., 2, 1865, p. 405.—Hyatt, Amer. Jour. Sci. Arts, 2d. ser., 39, 1865, p. 261-266.—Linney, Geol. Surv. Kentucky, Notes on Rocks Central Kentucky, 1883, p. 14.—Nicholson, Mon. British Strom., Pal. Soc., 1886, pp. 9, 86.—James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 245.—Miller, N. A. Geol. Pal., 1889, p. 155.—Grant, Jour. and Proc. Hamilton Assoc., 6, 1890, p. 122.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 94.—Grabau and Shimer, N. A. Index Foss., 1, 1906, p. 46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 699.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 37.

**Beatricea nodulifera** Foerste.

*Beatricea nodulifera* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 299, pl. 7, fig. 13; pl. 8, fig. 5.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 47, pl. 25, fig. 10.

Richmond (Liberty): Near Sulphur Spring, three miles southeast of Lebanon, and Bardstown, Kentucky.

**Beatricea nodulifera intermedia** Foerste.

*Beatricea nodulifera intermedia* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 300, pl. 8, figs. 4a-c.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 47, pl. 25, fig. 9.

Richmond (Liberty): Marion County, Kentucky.



**Beatricea nodulosa** Billings.

*Beatricea nodulosa* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-6, 1857, p. 344; Canadian Jour., n. s., 3, 1858, p. 332.—Hyatt, Proc. Boston Soc. Nat. Hist., 10, 1865, p. 19; Amer. Jour. Sci. and Arts, 2d ser., 39, 1865, pp. 262, 266.—Billings, Cat. Sil. Foss., Anticosti, Geol. Surv. Canada, 1866, p. 8 (loc. ref.).—Shaler, Amer. Nat., 11, 1877, p. 628.—Nicholson, Mon. British Strom., pt. 1, Pal. Soc., 1886, p. 87-89; pl. 8, figs. 1-8.—James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 245; 15, pt. 3, 1892, p. 95.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 114 (loc. occ.); Canadian Rec. Sci., 7, 1897, p. 132.—Grabau and Shimer, N. A. Index Foss., 1, 1906, p. 47, fig. 74.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 700, pl. 1, figs. 1a-b.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 300.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 45, pl. 25, figs. 2-5, 7-8.

Richmond: Wreck Point, Salmon River, etc., Anticosti; Stony Mountain, Manitoba; Ohio; Indiana; Kentucky.

**BEATRICEA SULCATA** Hyatt. See *Beatricea undulata*.

**Beatricea undulata** Billings.

*Beatricea undulata* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 344; Canadian Jour., n. s., 3, 1858, p. 332; Canadian Nat. Geol., n. s., 2, 1865, p. 405, figs. 1, 2.—Hyatt, Amer. Jour. Sci. and Arts, 2d ser., 39, 1865, pp. 261, 266.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 8, 34 (loc. ref.).—Shaler, Amer. Nat., 11, 1877, p. 628.—Nicholson, Mon. Brit. Strom., Pal. Soc., 1886, p. 89.—James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 245; 15, pt. 3, 1892, p. 95.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 114 (loc. occ.); Canadian Rec. Sci., 7, 1897, p. 133.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 47.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 701, pl. 1, fig. 1.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 298, pl. 8, fig. 3.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 43, pl. 25, figs. 1, 6, 7.

*Beatricea sulcata* Hyatt, Proc. Boston Soc. Nat. Hist., 10, 1865, p. 19 (error for *undulata*).

Richmond: Cape James, Table Head, etc., Anticosti; Snake Island, Lake St. John, Quebec; Rabbit and Club Islands, Lake Huron; Stony Mountain, Manitoba; Marion, Nelson, Madison, and Bullitt Counties, Kentucky; Ohio and Indiana.

**Beatricea undulata cylindrica** Foerste.

*Beatricea undulata-cylindrica* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 298, pl. 9, fig. 7.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 44.

Richmond: Four miles north Richmond, and Marion and Nelson counties, Kentucky (Liberty); Elkhorn Creek, south of Richmond, Indiana (Elkhorn).

**BELEMNOCYSTIS** Bather. See *Belemnocystites* Miller and Gurley.

**BELEMNOCYSTITES** Miller and Gurley.

Genotype: *B. wetherbyi* Miller and Gurley.

*Belemnocystites* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 8.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 739.

*Belemnocystis* Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 51.



**Belemnocystites wetherbyi** Miller and Gurley.

*Belemnocystites wetherbyi* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 9, pl. 1, figs. 4-6.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1321.

Frenton (Curdsville): Mercer County, Kentucky.

**BELLEROPHON** (part) of authors. See *Sinuities* Koken, *Salpingostoma* Roemer, *Bucanopsis* Ulrich, *Tetranota* Ulrich and Scofield, and *Oxydiscus* Koken.

**BELLEROPHON** Montfort.

Genotype: *B. vasulites* Montfort.

*Bellerophon* Montfort, *Conchiliologie Systematique*, 1, 1808, p. 51.—Pictet, *Traité de Pal.*, 2d ed., 3, 1855, p. 286.—Emmons, *Amer. Geology*, pt. 2, 1855, pp. 163, 164.—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 306.—Waagen, *Mem. Geol. Surv. India*, Pal. Indica, 13th ser., 1, 1880, pp. 130, 133.—Zittel, *Handb. Pal.*, 2, 1882, p. 183.—Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 192.—Nettelroth, *Kentucky Foss. Shells*, *Geol. Surv. Kentucky*, 1889, p. 158.—Koken, *Neues Jahrb. f. Min., Geol., Pal.*, Beilage-Band, 6, 1889, p. 385.—Miller, N. A. Geol. Pal., 1889, p. 396.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1899, p. 280.—Girty, 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 592.—Koken, *Die Leitfossilien*, 1896, pp. 100, 101, fig. 78, 2.—Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, pp. 853-914.—Pilsbry, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 445.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 948.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 618.—Dall, *Zittel-Eastman Textb. Pal.*, 2ed ed., 1913, p. 522.

**BELLEROPHON ACUTUS** Sowerby. See *Oxydiscus acutus*.

**Bellerophon allegoricus** White.

*Bellerophon allegoricus* White, *Geogr. Geol. Expl. West. 100th Merid.*, Prel. Rep., 1874, p. 10; *Rep. U. S. Geogr. Surv. West 100th Merid.*, 4, 1877, p. 55, pl. 3, fig. 6a-c.

Middle Ordovician: Fish Spring, House Range, Utah.

*Cotypes*.—Cat. No. 8564, U.S.N.M.

**BELLEROPHON ANGUSTATA** Billings. See *Tremanotus angustata*.

**BELLEROPHON ANTIQUATUS** Whitfield. See *Owenella antiquata*.

**BELLEROPHON ARGO** Billings. See *Oxydiscus argo*.

**Bellerophon auriculatus** Hall.

*Bellerophon auriculatus* Hall, *Pal. New York*, 2, 1852, p. 334, pl. 76, fig. 7a, b.—Emmons, *Man. Geol.*, 1860, p. 108, fig. 98.

Cayugan (Cobleskill): Schoharie, New York.

**BELLEROPHON BIDORSATUS** of authors. See *Tetranota bidorsata*.

**Bellerophon bilineatus** Ulrich.

*Bellerophon bilineatus* Ulrich, *Geol. Minnesota*, 3, pt. 2, 1897, p. 917, pl. 64, figs. 19-21.

Trenton (Flanagan): Near Danville, Kentucky.

*Holotype*.—Cat. No. 45697, U.S.N.M.

**BELLEROPHON BILOBATUS** Emmons. See *Sinuities cancellatus*.

**BELLEROPHON BILOBATUS** var. **ACUTUS** Hall. See *Sinuities cancellatus acutus*.

**BELLEROPHON BILOBATUS** var. **CORRUGATUS** Hall. See *Sinuities cancellatus corrugatus*.

**Bellerophon bretonensis** Matthew.

Bellerophon Bretonensis Matthew, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 409, pl. 18, figs. 4a-d; Geol. Surv. Canada Rep. Cambrian Rocks, Cape Breton, 1903, p. 218, pl. 18, figs. 4a-d.

Canadian (Bretonian-Div. C 3c.): McLeod Brook, near Boisdale, Cape Breton, Nova Scotia.

**Bellerophon calcifer** Cleland.

Bellerophon calcifer Cleland, Bull. Amer. Pal., 3, 1900, p. 126 (254), pl. 15, figs. 15-18; 4, 1903, p. 18.

Canadian (Tribes Hill): Fort Hunter and Canajoharie, New York.

BELLEROPHON CANADENSIS Billings. See *Salpingostoma canadensis*.

BELLEROPHON CANCELLATUS Hall. See *Sinuities cancellatus*.

**Bellerophon capax** Ulrich.

Bellerophon capax Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 921, pl. 63, figs. 50, 51; pl. 64, figs. 40-43.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. Nos. 45698, 45699, U.S.N.M.

BELLEROPHON CASSINENSIS Whitfield. See *Sinuities cassinensis*.

**Bellerophon charon** Billings.

Bellerophon Charon Billings, Canadian Nat. Geol., 5, 1860, p. 169, figs. 14, 15;

Geol. Canada, Geol. Surv. Canada, 1863, p. 146, fig. 97a, b.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

**Bellerophon cincinnatiensis** Miller and Faber.

Bellerophon cincinnatiensis Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 29, pl. 1, figs. 23, 24.

Maysville: Cincinnati, Ohio.

**Bellerophon clausus** Ulrich.

Bellerophon clausus Ulrich Geol. Minnesota, 3, pt. 2, 1897, p. 916, pl. 64, figs. 7-10.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, 1903, illust. sheet, fig. 32-34.

Trenton: Frankfort, Kentucky (Perryville), and near Nashville, Tennessee (Catheys).

Cotypes.—Cat. Nos. 45700, 45701, U.S.N.M.

**Bellerophon consimilis** Savage.

Bellerophon consimilis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 98, pl. 6, fig. 2.

Upper Medinan (Edgewood): Alexander County, Illinois; Missouri.

**Bellerophon convolutus** Eaton.

Not recognized.

Bellerophon convolutus Eaton, Geol. Textb., 2d ed., 1832, p. 28.

Silurian(?): Helderberg, New York.

**Bellerophon declivis** Conrad.

Bellerophon declivis Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 269, pl. 17, fig. 3.

Trenton: Near Carlisle, Pennsylvania.

**Bellerophon dilatatus** (Sowerby?) Billings.

Bellerophon dilatatus (Sowerby?) Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 56 (loc. ref.).

Anticostian (Gun River and Jupiter River): The Jumpers, Anticosti.

**BELLEROPHON DISCULUS** Billings. See *Oxydiscus disculus*.

**BELLEROPHON (BUCANIA) EXIGUA** Foerste. See *Bucania exigua*.

**BELLEROPHON EXPANSUS** Emmons. See *Salpingostoma expansa*.

**BELLEROPHON FISCELLO-STRIATUS** Foerste. See *Bucania fiscoello-striata*.

**BELLEROPHON FRATERNUS** Billings. See *Salpingostoma fraternum*.

**BELLEROPHON GLOBULARIS** Miller and Faber. See *Sinuities globularis*.

**Bellerophon gorbyi** Miller.

*Bellerophon gorbyi* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 694, pl. 14, figs. 7-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 953, pl. 39, figs. 1-1b.

Maysville: Dearborn County, Indiana.

**Bellerophon helderbergiae** Maynard.

*Bellerophon helderbergiae* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 466, pl. 79, figs. 3, 4.

Helderbergian (Keyser): Cash Valley, Maryland.

**Bellerophon insulae** Matthew.

*Bellerophon insulae* Matthew, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 408, pl. 18, fig. 3; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 217, pl. 18, fig. 3.

Canadian (Bretonian—Div. C3c2): McLeod Brook, near Boisdale, Cape Breton, Nova Scotia.

**BELLEROPHON INTEXTUS** Emmons. See *Bucania intexta*.

**BELLEROPHON LINDSLEYI** Safford. See *Bucania lindsleyi*.

**Bellerophon lirata** Hall.

*Bellerophon (Bucania) lirata* Hall, Geol. Rep. Wisconsin, 1862, p. 55, figs. 7, 8. Richmond (Maquoketa): Southwestern Wisconsin.

**BELLEROPHON MACER** Billings. See *Oxydiscus macer*.

**Bellerophon miser** Billings.

*Bellerophon miser* Billings, Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 20.

Richmond (English Head): Macasty Bay, Anticosti.

**Bellerophon mohri** Miller.

*Bellerophon Mohri* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 306, fig. 30; N. A. Geol. Pal., 1889, p. 397, fig. 653.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 920, pl. 64, figs. 44-45.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 954, pl. 39, figs. 2-2a.

Richmond (Whitewater): Richmond, Indiana; Lincoln County, Kentucky.

*Plesiotypes*.—Cat. No. 45702, U.S.N.M.

**BELLEROPHON MORROWENSIS** Miller and Dyer. See *Sinuities morrowensis*.

**Bellerophon nashvillensis** Troost.

*Bellerophon Nashvillensis* Troost, 5th Geol. Rep. Tennessee, 1840, p. 54; 6th Rep., 1841, p. 175 (nom. nud.); 7th Rep., 1844, p. 17.

Ordovician: Davidson County, Tennessee.

Observation.—Not defined. Probably refers to the abundant *Bellerophon troosti* D'Orbigny.



**Bellerophon nautarum** Salter.

Bellerophon Nautarum Salter, Sutherland's Jour. Voyage in Baffins Bay, etc., 2, App., 1852, p. cccxiii, pl. 5, fig. 20.

Niagaran: Dundas Island, Victoria Channel, Arctic America.

BELLEROPHON (BUCANIA) OPERTUS Foerste. See Bucania operta.

BELLEROPHON PALINURUS Billings. See Oxydiscus palinurus.

**Bellerophon patersoni** Hall.

Bellerophon patersoni Hall, Geol. Rep. Wisconsin, 1862, p. 55, fig. 9.

Richmond (Maquoketa): Southwestern Wisconsin.

BELLEROPHON (BUCANIA) PERFORATUS Winchell and Marcy. See Tremanotus alpheus.

**Bellerophon platystoma** (Meek and Worthen).

Bellerophon (Bucania?) platystoma Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 312, pl. 3, figs. 8a, b.

Bellerophon platystoma Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 918, pl. 64, figs. 22-30.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 619, figs. 829d-g.

Trenton: Galena and Dixon, Illinois (Galena); Kenyon, Wykoff, etc., Minnesota (Prosser).

*Plesiotypes*.—Cat. Nos. 45703, 45704, U.S.N.M.

**Bellerophon profundus** Emmons.

Bellerophon profundus Emmons, Nat. Hist. New York Geol., 2, 1842, p. 393, fig. 103; Amer. Geology, 1, pt. 2, 1855, p. 233, pl. 17, fig. 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 86, figs.

Trenton: Watertown, New York.

BELLEROPHON PUNCTIFRONS Emmons. See Bucania punctifrons.

**Bellerophon recurvus** Ulrich.

Bellerophon recurvus Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 920, pl. 64, figs. 11-13.

Maysville (Corryville): Cincinnati, Ohio.

*Cotypes*.—Cat. No. 45705, U.S.N.M.

**Bellerophon rogersensis** Foerste.

Bellerophon rogersensis Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 141, pl. 2, figs. 4a-c.

Trenton (Upper): Near Rogers Gap, Kentucky.

BELLEROPHON ROTUNDATUS Emmons. See Bucania sulcatina.

**Bellerophon rugosus** Emmons.

Bellerophon rugosus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 166, fig. 37; Man. Geol., 1860, p. 103, fig. 93.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 853 (gen. ref.).

Bucania rugosa Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 97, fig.

Cincinnati (Pulaski): Lorraine, Jefferson County, New York.

**Bellerophon semisculptus** Matthew.

Bellerophon semisculptus Matthew, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 410, pl. 18, fig. 5; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 219, pl. 18, fig. 5.

Canadian (Bretonian—Div. C3c2): McLeod Brook, near Boisdale, Cape Breton, Nova Scotia.

**Bellerophon shelbiensis** Clarke and Ruedemann.

*Bucania stigmosa* Whiteaves (not Hall), Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 34, pl. 5, fig. 3; pl. 8, fig. 4.

*Bellerophon shelbiensis* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 51, pl. 5, figs. 13-19.

Niagaran (Guelph-Shelby): Shelby, New York.

**Bellerophon similis** Ulrich and Scofield.

*Bellerophon similis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 919, pl. 64, figs. 31-39.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 165.

Trenton: Wykoff, Kenyon, etc., Minnesota (Prosser); Head of Frobisher Bay, Baffin Land.

*Cotypes*.—Cat. Nos. 45706, 45707, U.S.N.M.

**Bellerophon solitarius** Billings.

*Bellerophon solitarius* Billings, Cat. Sil. Fossils, Anticosti, Geol. Surv. Canada, 1866, p. 20.

Richmond (English Head): McCasty Bay, Anticosti.

**Bellerophon subangularis** Ulrich.

*Bellerophon subangularis* Ulrich, Geol. Minnesota, 3, 1897, p. 920, pl. 64, figs. 14-16.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 954, pl. 39, figs. 3-3b.

Richmond (Whitewater): Richmond, Indiana.

*Holotype*.—Cat. No. 45708, U.S.N.M.

**Bellerophon subglobulus** Ulrich.

*Bellerophon subglobulus* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 917, pl. 64, figs. 17 and 18.

Black River (Lowville): Mercer County, Kentucky.

*Holotype*.—Cat. No. 45709, U.S.N.M.

**Bellerophon subovatus** Cleland.

*Bellerophon subovatus* Cleland, Bull. Amer. Pal., 3, 1909, p. 217 (255), pl. 15, figs. 19-21.

Canadian (Tribes Hill): Near Fort Hunter, New York.

**BELLEROPHON SULCATINUS** of authors. See *Bucania sulcatina*.

**BELLEROPHON TRILOBATUS** Hall. See *Bucanella trilobata*.

**Bellerophon troosti** D'Orbigny.

*Bellerophon troosti* D'Orbigny, Cephalopoda, 1840, p. 206.—Safford, Geol. Tennessee, 1869, p. 289, pl. 3G, figs. 4a-4d.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 915, pl. 64, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 618, fig. 829a-c.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, p. 183, fig. 20, 9, 10.

Trenton: Nashville, Hartsville, etc., Tennessee (Catheys) Danville; Frankfort, etc., Kentucky (Flanagan); Virginia.

*Plesiotypes*.—Cat. Nos. 45710, 45711, U.S.N.M.

**Bellerophon troosti burginensis** Ulrich.

*Bellerophon troosti* var. *burginensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 916, pl. 64, fig. 6.

Trenton (Flanagan): Near Burgin and Danville, Kentucky.

*Holotype*.—Cat. No. 45712, U.S.N.M.

**Bellerophon tuber** Hall.

*Bellerophon tuber*, Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 30, figs. 19, 20; mus. ed., 1879, p. 177, pl. 30, figs. 19, 20; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 320, pl. 31, figs. 19, 20; pl. 33, fig. 6.

Niagaran (Waldron): Waldron, Indiana.

**Bellerophon volutus** Eaton.

Not recognized.

*Bellerophon volutus* Eaton, Geol. Textb., 1832, p. 28.

Silurian: Helderberg region of New York.

**BELLEROPHON WISCONSINENSIS** Whitfield. See *Tetranota wisconsinensis*.

**BERENICEA** Lamouroux.

Genotype: *Berenicea diluviana* Lamouroux.

*Berenicea* Lamouroux (part), Expos. Meth. des Genres d. Pol., 1821, p. 80.—McCoy, Brit. Pal. Foss., 52, p. 44.—D'Orbigny, Pal. Franc. Terr. Cret., 5, 1854, p. 858.—Haime, Bry. de la Form. Juras., 1854, p. 175.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 149.—Miller, N. A. Geol. Pal., 1889, p. 294.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 368; Geol. Minnesota, 3, 1893, p. 120.—Zittel's Textb. Pal. (Engl. ed.), 1896, p. 261.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 594.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 20.—Bassler, Bull. U. S. Geol. Surv. 292, 1906, p. 16.—Hennig, Archiv. fur Zool., K. Sven. Vet.-Akad. Stockholm, 3, No. 10, 1906, p. 25.—Grabau and Shimer, N. A. Index Fossils, I, 1907, p. 119.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 741.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 319.

*Rosacilla* Roemer, Verst. des Norddeutsh. Kreidegeb., 1840, p. 19.

*Diastopora* (not Lamouroux) D'Orbigny, Busk and other English authors.

*Diastoporella* Vine, Rep. Brit. Assoc. Adv. Sci., 52, 1883, p. 275; Rep. 53d Meeting Brit. Assoc. Adv. Sci., 1884, p. 187; Proc. Yorkshire Geol. Polytech. Soc., 9, 1887, p. 190.

*Sagenella* Hall, Amer. Jour. Sci. and Arts, 2d ser., 11, 1851, p. 401; Pal. New York, 2, 1852, p. 172.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 171.—Miller, N. A. Geol. Pal., 1889, p. 321.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 8.—Simpson, 14th Ann. Rep. State Geol. New York, 1897, p. 597.

**Berenicea consimilis** (Lonsdale).

*Aulopora consimilis* Lonsdale, in Murchison's Sil. Syst., pt. 2, 1839, p. 675, pl. 15. ——— Hall, Pal. New York, 2, 1852, p. 173, pl. 40E, figs. 8a, b.

*Diastopora consimilis* Vine, Quart. Jour. Geol. Soc. London, 38, 1882, p. 58.

*Diastoporella consimilis* Vine, Rep. 53d meeting British Assoc. Adv. Sci., 4, 1883; Proc. Yorkshire Geol. and Polytech. Soc., 9, 1887, p. 190, pl. 12, figs. 18–20.

*Berenicea consimilis* Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 16, 17, pl. 5, figs. 1–5.

*Sagenella membranacea* Hall, Pal. New York, 2, 1852, p. 172, pl. 40E, figs. 6a, b.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 181.

*Sagenella elegans* Hall, 28th Rep. New York State Mus., doc. ed., 1876, pl. 7, figs. 12, 13; Mus. ed., 1879, p. 118, pl. 7, figs. 12, 13; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 242, pl. 6, figs. 12, 13.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 917, figs.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 20, fig. 4.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 181.

Silurian: Dudley and Shropshire, England (Wenlock); Island of Gotland; western New York and Ontario (Rochester); Osgood, Indiana (Osgood); Waldron, Indiana; and Newsom, Tennessee (Waldron).

*Plesiotypes*.—Cat. Nos. 35565, 44115, U.S.N.M.



*BERENICEA ELEGANS* Nickles and Bassler. See *Berenicea consimilis*.

*BERENICEA MEMBRANACEA* Nickles and Bassler. See *Berenicea consimilis*.

***Berenicea minnesotensis* Ulrich.**

*Berenicea minnesotensis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 58; Geol. Minnesota, 3, 1893, p. 120, pl. 1, figs. 25, 27, 29, pl. 2, fig. 1.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 595, figs. 197, 198.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 119, fig. 178e. *Proboscina minnesotensis* Sardeson, Jour. Geol., 9, 1901, p. 169, fig. 2B. Black River (Decorah): Minneapolis, Minnesota, and vicinity. *Cotypes*.—Cat. No. 43269, U.S.N.M.

***Berenicea primitiva* Ulrich.**

*Berenicea primitiva* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 157, pl. 6, fig. 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 779, pl. 26, fig. 12. Maysville and Richmond: Cincinnati, Waynesville, Lebanon, Clarksville, etc., Ohio; Richmond and Versailles, Indiana. *Holotype*.—Cat. No. 43268, U.S.N.M.

***Berenicea vesiculosa* Ulrich.**

*Berenicea vesiculosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 158, pl. 6, fig. 5. Eden: Cincinnati, Ohio, and vicinity. *Holotype*.—Cat. No. 43267, U.S.N.M.

***BEYRICHIA* McCoy.**

Genotype: *B. kløedeni* McCoy.

*Beyrichia* McCoy (part), Synop. Sil. Foss. Ireland, 1846, p. 57.—Bell and Forbes, in Burmeister's Org. Tril., London, Suppl. App., 1846, p. 124.—McCoy, Brit. Pal. Rocks and Foss., 1854, p. 135.—Jones, Ann. Mag. Nat. Hist., 2d ser., 16, 1855, p. 85.—Hall, Pal. New York, 3, 1859, p. 377.—Barrande, Syst. Sil. du Centre Bohme, 1, Suppl., 1872, p. 490.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 118.—Zittel, Handb. Pal., 2, 1885, p. 553.—Reuter, Zeits. d. d. Geol. Gesell., 37, 1885, p. 628.—Jones and Holl, Ann. Mag. Nat. Hist., 5th ser., 17, pp. 338, 345.—Jones and Kirkby, Proc. Geol. Assoc. (London), 9, 1886, p. 505.—Verworm, Zeits. d. d. Geol. Gesell., 39, 1887, p. 27.—Krauss, ibid., 41, 1889, p. 17.—Miller, N. A. Geol. Pal., 1889, p. 534.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 8, pl. 2, figs. 19–21.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 657.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40, text fig. 26B, p. 431.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 306.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 151; 35, 1908, pp. 283, 284.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355.—Bassler, Zittel-Eastman Textb., Pal., 2d ed., 1913, p. 738.

Observation.—Most of the earlier references in the above bibliography are not to *Beyrichia* as now restricted.

***Beyrichia atlantica* Billings.**

*Beyrichia Atlantica* Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 300. Chazyan (Quebec—L, M): Point Rich and Table Head, Newfoundland.

*BEYRICHIA BARRETTI* Weller. See *Kløedenia barretti*.

***Beyrichia bella* Walcott.**

*Beyrichia bella* Walcott, Desc. new Spec. Trenton Group, 1883, p. 7, pl. 17, fig. 11; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 213, pl. 17, figs. 11, 11a. Trenton: Trenton Falls, New York.

BEYRICHTIA BICORNIS Miller. See *Dicranella bicornis*.

BEYRICHTIA BUCHIANA Jones. See *Bollia persulcata*.

BEYRICHTIA CHAMBERSI Miller. See *Ceratopsis chambersi*.

BEYRICHTIA CHAMBERSI VAR. ROBUSTA Ulrich. See *Ceratopsis robusta*.

BEYRICHTIA CILIATA Emmons. See *Ctenobolbina ciliata*.

BEYRICHTIA CINCINNATIENSIS Miller. See *Primitia cincinnatiensis*.

BEYRICHTIA CLARKEI Jones. See *Klœdenella clarkei*.

**Beyrichia clathrata** Jones.

*Beyrichia clathrata* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 242, pl. 9, fig. 1.

Niagaran: Beechey Island, Arctic America.

BEYRICHTIA CLAVIGERA Jones. See *Isochilina?* *clavigera*.

BEYRICHTIA CLAVIGERA CLAVIFRACTA Jones. See *Isochilina?* *clavigera clavifracta*.

BEYRICHTIA DECKERENSIS Weller. See *Klœdenia manliensis deckerensis*.

BEYRICHTIA DECORA Billings. See *Beyrichia venusta*.

**Beyrichia difflsa** Jones.

*Beyrichia difflsa* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 546, pl. 21, fig. 7.

Anticostian (Jupiter River): Jupiter River, Anticosti.

BEYRICHTIA DURYI Miller. See *Ctenobolbina duryi*.

**Beyrichia equilatera** Hall.

*Beyrichia equilatera* Hall, Canadian Nat. Geol., 5, 1860, p. 158, fig. 20.—Dawson, Acadian Geol., 2d ed., 1868, p. 609, fig. 217.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 18, pl. 2, fig. 6; p. 552; Geol. Surv. Canada, Contr. Micro-Pal., pt. 3, 1891, p. 72, pl. 11, fig. 6.

Silurian: Arisaig, Nova Scotia.

**Beyrichia forbesi** Jones.

*Beyrichia Forbesii* Jones, Quart. Jour. Geol. Soc. London, 17, 1861, p. 67, pl. 4, figs. 13a-c.

Silurian: Mount Illampu, Bolivia.

**Beyrichia granulosa** Hall.

*Beyrichia granulosa* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 32, fig. 4; mus. ed., 1879, p. 186, pl. 32, fig. 4; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 331, pl. 34, fig. 4.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 37, fig. 15.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig. 1663a.

Niagaran (Waldron): Waldron, Indiana.

BEYRICHTIA HALLI Jones. See *Klœdenella halli*.

BEYRICHTIA HAMMELLI Miller and Faber. See *Ctenobolbina hammelli*.

BEYRICHTIA INITIALIS Ulrich. See *Klœdenia initialis*.

BEYRICHTIA JERSEYENSIS Weller. See *Klœdenia jerseyensis*.

BEYRICHTIA KÜMMELI Weller. See *Klœdenia kümmeli*.

**Beyrichia lata** (Vanuxem).

*Agnostus latus* Vanuxem, Geol. New York, 3d Geol. Dist., 1842, p. 80.

*Beyrichia lata* Hall (part), Pal. New York, 2, 1852, p. 301, pl. A 66, figs. 10c-e.  
(Not b=*Bollia lata*.)—Jones, Ann. Mag. Nat. Hist., 2d ser., 16, 1855, p. 168,  
pl. 6, fig. 13.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 90,  
figs.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 292, fig. 25.

Clinton: New York, Pennsylvania, Maryland, etc.

*Plesiotype*.—Cat. No. 41557, U.S.N.M.

**Beyrichia lata triplicata** Foerste.

*Beyrichia lata-triplicata* Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 329;  
Jour. Cincinnati Soc. Nat. Hist., 21, 1909, pl. 1, fig. 4.

Clinton (Alger): Lewis County, Kentucky.

BEYRICHIA LOGANI Jones. See *Primitia logani*.

BEYRICHIA LOGANI var. *LEPERDITIODES* Jones. See *Primitia logani leperditioides*.

BEYRICHIA LOGANI var. *RENIFORMIS* Jones. See *Primitia logani reniformis*.

BEYRICHIA MANLIENSIS Miller. See *Kloedenia manliensis*.

BEYRICHIA MARGINATA Miller. See *Dicranella marginata*.

BEYRICHIA MONTAGUENSIS Weller. See *Kloedenia montaguensis*.

**Beyrichia moodeyi** Ulrich and Bassler.

*Beyrichia moodeyi* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 285,  
pl. 37, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig.  
1663d.

Cayugan (Mackenzie): Near Cacapon, West Virginia.

*Cotypes*.—Cat. No. 53936, U.S.N.M.

BEYRICHIA NEARPASSI Weller. See *Kloedenia nearpassi*.

BEYRICHIA NOETLINGI Reuter. See *Beyrichia tuberculata noetlingi*.

BEYRICHIA NOTATA Hall. See *Kloedenia notata*.

BEYRICHIA NOTATA var. *VENTRICOSA* Hall. See *Kloedenia notata ventricosa*.

BEYRICHIA OCULIFERA Miller. See *Ceratopsis oculifera*.

**Beyrichia parallela** (Ulrich).

*Primitia*? (?*Beyrichia*) *parallela* Ulrich, Geol. Surv. Canada, Contr. Micro-Pal.,  
pt. 2, 1889, p. 51, pl. 9, figs. 7, 7a.

*Beyrichia* (?*Primitia*) *parallela* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890,  
p. 125, pl. 10, fig. 15a-c.

*Beyrichia parallela* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319,  
fig. 64.

Richmond: Stony Mountain, Manitoba (Stony Mountain); Richmond, Indiana;  
Oxford, Ohio (Whitewater); Anticosti (Charleton).

*Plesiotype*.—Cat. No. 41434, U.S.N.M.

BEYRICHIA PERINFLATA Weller. See *Kloedenia sussexensis*.

BEYRICHIA PERSULCATA Ulrich. See *Bollia persulcata*.

**Beyrichia plagosa** Jones.

*Beyrichia plagosa* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 243, pl. 9, fig. 2.  
Niagaran: Beechey Island, Arctic America.



**Beyrichia pustulosa** Hall.

*Beyrichia pustulosa* Hall, Canadian Nat. Geol., 5, 1860, p. 157, fig. 19.—Dawson, Acadian Geol., 2d ed., 1868, p. 608, fig. 216.

*Beyrichia tuberculata* var. *pustulosa* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 18, pl. 2, fig. 1a-c; Geol. Surv. Canada, Contr. Micro-Pal., pt. 3, 1891, p. 76, pl. 11, fig. 2.

Silurian: Arisaig, Nova Scotia.

**BEYRICHIA QUADRIFIDA** Jones. See *Ceratopsis?* *quadrifida*.

**BEYRICHIA QUADRILIRATA** Hall and Whitfield. See *Tetradella quadrilirata*.

**BEYRICHIA REGULARIS** Emmons. See *Bollia regularis*.

**BEYRICHIA REGULARIS** Miller. See *Tetradella quadrilirata*.

**BEYRICHIA RICHARDSONI** Miller. See *Drepanella richardsoni*.

**BEYRICHIA RUGULIFERA** Jones. See *Primitia rugulifera*.

**BEYRICHIA SIGILLATA** Jones. See *Primitia sigillata*.

**BEYRICHIA SIMPLEX** Miller. See *Dicranella?* *simplex*.

*Beyrichia simplex* Emmons. —Not recognized.

*Beyrichia simplex* Emmons (not Jones, 1853), Amer. Geology, 1, pt. 2, 1855, p. 218, fig. 74a.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 91, fig.

Blue limestone: Ohio.

**BEYRICHIA SMOCKI** Weller. See *Kloedenia smocki*.

**BEYRICHIA SPINOSA** Hall. See *Æchmina spinosa*.

**BEYRICHIA SPINOSA** Miller. See *Dicranella spinosa*.

**BEYRICHIA STRIATO-MARGINATUS** Miller. See *Eurychilina?* *striatomarginata*.

**BEYRICHIA SUSSEXENSIS** Weller. See *Kloedenia sussexensis*.

**BEYRICHIA SYMMETRICA** Hall. See *Kloedenella symmetrica*.

**BEYRICHIA SYMMETRICA** Emerson. See *Drepanella symmetrica*.

**BEYRICHIA TRISULCATA** Hall. See *Kloedenella trisulcata*.

**Beyrichia tuberculata** (Kloeden).

*Battus tuberculatus* Kloeden (part), Verstein. der Mark Brandenburg, 1834, p. 115-117, pl. 1, figs. 21-23.

*Agnostus tuberculatus* Quenstedt, Petrefactenkunde, 1852, p. 302, pl. 23, figs. 25-28.

*Beyrichia tuberculata* Boll, Palæontographica, 1, 1847, p. 127; Archiv des Vereins der Freunde der Naturgeschichte in Meklenburg, 16 Jahr., 1862, p. 119, pl. 1, figs. 1a, b.—Bronn and Roemer, Lethæa geog., 1, 1854, p. 536, pl. 10, figs. 9a-d.—Jones, Ann. Mag. Nat. Hist., 2d ser., 16, 1855, p. 86, pl. 5, figs. 4-9b; Proc. Geol. Soc., Pal. Div. Entom., 1869, p. 12, figs. 12a-c; Geol. Mag., dec. 2, 3, 1881, p. 344, pl. 10, figs. 8-10; Ann. Mag. Nat. Hist., 6th ser., 1, 1888, p. 402, pl. 21, fig. 12.—Roemer, Lethæa palæozoica, 1876, pl. 19, figs. 9a-d.—Krause, Zeitschr. d. d. geol. Gesell., 29, 1877, p. 30, pl. 1, figs. 12a, b.—Hoernes, Palæontologie, 1884, p. 379, figs. 525c, d.—Reuter, Zeits. d. d. geol. Ges., 37, 1885, p. 632, pl. 25, figs. 1a, b.—Zittel, Handb. Pal., 2, 1885, p. 553, figs. 739, 740.—Verworn, Zeitschr. d. d. geol. Gesell., 1887, p. 31, pl. 3, fig. 12.—Jones, Contr. Micro-Pal., Geol. Surv. Canada, 3, 1891, p. 74, pl. 2, fig. 3.

Silurian: Europe; Stonehouse Brook, Arisaig, Nova Scotia.

**Beyrichia tuberculata noetlingi** (Reuter).

*Beyrichia Noetlingi* Reuter, Zeits. d. d. geol. Gesell., 37, 1885, p. 637, pl. 25, figs. 5a, 5b.

*Beyrichia tuberculata* var. *noetlingi* Jones, Contr. Micro. Pal. Geol. Surv. Canada, 3, 1891, p. 78, pl. 11, figs. 4a, b, 5.

Silurian: Europe; Stonehouse Brook, Arisaig, Nova Scotia.

**BEYRICHIA TUBERCULATA** var. **PUSTULOSA** Jones. See *Beyrichia pustulosa*.

**Beyrichia tuberculata strictispiralis** Jones.

*Beyrichia tuberculata* var. *strictispiralis* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 77, pl. 11, fig. 1.

Silurian: Arisaig, Nova Scotia.

**Beyrichia tumida** (Ulrich).

*Ctenobolbina tumida* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 11, pl. 7, figs. 5a-5b.

*Beyrichia tumida* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 285; p. 292, fig. 24; p. 294, fig. 33.

Richmond (lower): McKinneys and Moreland, Kentucky.

*Holotype* and *plesiotype*.—Cat. Nos. 41326, 41327, U.S.N.M.

**BEYRICHIA TUMIFRONS** Hall. See *Ctenobolbina ciliata*.

**Beyrichia venusta** Billings.

*Beyrichia venusta* Billings, Geol. Surv. Canada, Cat. Sil. Foss. Anticosti, 1866, p. 68.

*Beyrichia decora* Billings, *ibid.*, p. 67.

Anticostian (Jupiter River): East Point, Chaloupe River, Jumpers, etc., Anticosti.

Observation.—*B. decora* was based on the female form of *B. venusta*.

**Beyrichia waldronensis** Ulrich and Bassler.

*Beyrichia waldronensis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 286, pl. 27, figs. 9, 10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig. 1663b, c.

Niagaran (Waldron): Waldron, Indiana.

*Cotypes*.—Cat. No. 41660, U.S.N.M.

**BEYRICHIA WALLPACKENSIS** Weller. See *Klodenia wallpackensis*.

**BILLINGSSELLA** Hall and Clarke. Genotype: *Orthis coloradoensis* Shumard.

*Kutorgina* Hall and Clarke (not Walcott), Pal. New York, 8, pt. 1, 1892, pp. 90-94.

*Billingsella* Hall and Clarke, 11th Ann. Rep. State Geol. New York, 1892, p. 273; 45th Ann. Rep. New York State Mus., 1892, p. 589; Pal. New York, 8, pt. 1, 1892, pp. 230-231.—Schuchert (part), Bull. U. S. Geol. Surv., 87, 1892, p. 158.—Walcott (part), Proc. U. S. Nat. Mus., 28, 1905, pp. 227-229.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 210.—Walcott, Smiths. Misc. Coll., 53, 1908, pp. 142 and 148, pl. 11; Mon. U. S. Geol. Surv., 51, 1912, p. 749.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 380.

**Billingsella coloradoensis** (Shumard).

*Orthis coloradoensis* Shumard, Trans. Acad. Sci. St. Louis, 1, 1860, p. 627.

*Orthis pepina* Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, pp. 134-135, pl. 6, figs. 23-27.—Whitfield, Geol. Wisconsin, 4, pt. 3, 1882, pp. 170-171, pl. 1, figs. 4, 5.

*Orthis?* (*Orthisina?*) *pepina* Hall, 2d Ann. Rep. State Geol. New York, 1883, pl. 8, figs. 1, 2.

**Billingsella coloradoensis**—Continued.

*Orthis* (*Billingsella*) *pepina* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 96.

*Billingsella pepina* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 230, pl. 7, figs. 16–19; pl. 7a, figs. 7–9.

*Billingsella coloradoensis* Walcott, Mon. U. S. Geol. Surv., 32, pt. 2, 1899, pp. 450–451, pl. 61, figs. 1, 1a–d; Proc. U. S. Nat. Mus., 28, 1905, pp. 231–234.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 210.—Walcott, Mon. U. S. Geol. Surv., 51, 1912, pp. 299, 751, fig. 6, pl. 85, figs. 1, 1a–z.

Ozarkian (Oneota): Stillwater, Washington County, Minnesota. Middle and Upper Cambrian of Montana, Texas, Wisconsin, etc.

*Plesiotypes*.—Cat. Nos. 34774, 34776, U.S.N.M.

**Billingsella dice** Walcott.

*Billingsella dice* Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 234; Mon. U. S. Geol. Surv., 51, 1912, p. 754.

Lower Ordovician (drift boulder of sandstone): St. Albans, Franklin County, Vermont.

*Holotype* and *paratypes*.—Cat. No. 52248, U.S.N.M.

**Billingsella(?) grandæva** (Billings).

*Orthisina grandæva* Billings, Canadian Nat. Geol., 4, 1859, p. 349, fig. 1; Geol. Canada, 1863, p. 113, fig. 21.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 540, fig.

Canadian (Romaine): Mingan Islands, Canada.

Observation.—See *Orthis piger* for a possible synonym.

*BILLINGSSELLA LAURENTINA* Hall and Clarke. See *Orthis(?) laurentina*.

*BILLINGSSELLA PEPINA* Hall and Clarke. See *Billingsella coloradoensis*.

**Billingsella(?) primordialis** (Whitfield).

*Streptorhynchus?* *primordiale* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 301, pl. 24, fig. 7.—Lesley, Geol. Surv. Pennsylvania, Rep., P 4, 1890, p. 1096, fig.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 52, fig. 7.

Canadian (Beekmantown): Fort Cassin, Vermont.

*BILLINGSIA* Ford. See *Elkania* Ford.

*BILLINGSIA* Walcott. See *Matherella* Walcott.

*BILLINGSIA PRETIOSA* Ford. See *Acrothele pretiosa*.

*BILLINGSIA SARATOGENSIS* Walcott. See *Matherella saratogensis*.

**BILLINGSITES** Hyatt.

Genotype: *Ascoceras canadense* Billings.

*Billingsites* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 278.—Zittel, Handb. Pal., 2, 1884, p. 373.—Hyatt, Zittel-Eastman, Textb. Pal., 1, 1900, p. 516; 2d ed., 1913, p. 597.

**Billingsites canadensis** (Billings).

*Ascoceras Canadense* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 310; Geol. Canada, Geol. Surv. Canada, 1863, p. 218, fig. 227; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 23 (loc. ref.).—Miller, N. A. Geol. Pal., 1889, p. 432, fig. 726.

*Billingsites canadense* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 278 (gen. ref.).

Richmond (English Head and Charleton): English Head, etc., Anticosti.



**BILOBITES** Linnaeus.Genotype: *Anomia biloba* Linnaeus.

*Bilobites* Linnaeus, *Syst. Naturae*, ed. Muller, 6, 1775, p. 325.—Zittel, *Handb. Pal.*, 1, Munich, 1880, p. 674.—Nathorst, *Kongl. Sven. Vet.-Akad. Handl.*, 18, No. 7, 1881, pp. 38, 87.—Waagen, *Mem. Geol. Surv. India*, *Pal. Indica*, 13th ser., 1, 1884, p. 549.—Hall, *Bull. Geol. Soc. Amer.*, 1, 1889, p. 21.—Dawson, *Quart. Jour. Geol. Soc. London*, 46, 1890, p. 595.—Beecher, *Amer. Jour. Sci.*, 3d ser., 42, 1891, p. 51; 44, 1892, p. 152.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 204, 223; 11th Ann. Rep. New York State Geol., 1894, p. 269.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 234.—Cumings, *Amer. Jour. Sci.*, 4th ser., 1903, p. 40.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 259.

*Dicælosia* King, *Mon. Permian Fossils England*, *Pal. Soc.*, 1850, p. 106.

***Bilobites acutilobus*** (Ringueberg).

*Orthis acutiloba* Ringueberg, *Proc. Acad. Nat. Sci. Philadelphia*, 1888, p. 134, pl. 7, fig. 5.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 507, figs.

*Bilobites acutilobus* Beecher, *Amer. Jour. Sci.*, 3d ser. 42, 1891, p. 52, pl. 1, fig. 1. Clinton (Rochester): Lockport, New York.

***Bilobites bilobus*** (Linnaeus).

*Anomia biloba* Linnaeus, *Systema Naturæ*, ed. 12, 1767, p. 1154.

*Delthyris sinuatus* Hall, *Geol. New York*, Rep. 4th Dist., 1843, p. 105, fig. 8.—Owen (Hall), *Amer. Jour. Sci. Arts*, 48, 1845, p. 313, fig. 8.

*Spirifer bilobus* Hall, *Amer. Jour. Sci.*, 2d ser., 20, 1849, p. 228; *Pal. New York*, 4, 1852, p. 260, pl. 54, fig. 1.

*Orthis biloba* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 85.—Davidson, *Mon. British Sil. Brach.*, *Pal. Soc.*, 1869, p. 206, pl. 26, figs. 10-15.—Safford, *Geol. Tennessee*, 1869, p. 315, fig. 10.—Hall, 11th Rep. State Geol. Indiana, 1882, p. 286, pl. 27, fig. 16.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 510, fig.

*Bilobites bilobus* Beecher, *Amer. Jour. Sci.*, 3d ser., 42, 1891, p. 52, pl. 1, fig. 28.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 190, 204, 205, 223, pl. 5B, figs. 11-14.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 259.

Niagaran: Lockport, etc., New York; Ontario (Rochester); Waldron, Indiana, and Newsom, Tennessee (Waldron).

Anticostian (Gun River and Jupiter River): Anticosti.

**BISTRAMIA** Hoek.Genotype: *B. elegans* Hoek.

*Bistramia* Hoek, *Neues Jahrb. Min., Geol., Pal.*, 34, 1912, p. 247.

***Bistramia elegans*** Hoek.

*Bistramia elegans* Hoek, *Neues Jahrb. Min., Geol., Pal.*, 34, 1912, p. 247, pl. 8, figs. 12, 13.

Ordovician: Totorapampa, Bolivia.

**BLASTOIDOCRINUS** Billings.Genotype: *B. carchariædens* Billings.

*Blastoidocrinus* Billings, *Geol. Surv. Canada*, dec. 4, 1859, p. 18.—Chapman, *Canadian Jour.*, n. s., 6, 1861, p. 514, footnote; *Expos. Min. Geol. Canada*, 1864, p. 108.—Zittel, *Handb. Pal.*, 1, 1879, p. 423.—Etheridge and Carpenter, *Ann. Mag. Nat. Hist.*, 5th ser., 9, 1882, p. 214, footnote.—Miller, *N. A. Geol. Pal.*, 1889, p. 229.—Jaekel, *Stammesgeschichte d. Pelmatozoen*, 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 389.—Bather, *Rep. Mus. Assoc.*, 1900, p. 103; *Treatise on Zool.*, pt. 3, *Echinoderma* 1900, p. 80, fig. 3.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 477.—Hudson, *Bull. New York State Mus.*, 149, 1911, p. 203.—Springer, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 167.

**Blastoidocrinus carchariædens** Billings.

*Blastoidocrinus carchariædens* Billings, Can. Org. Rem., dec. 4, Geol. Surv. Canada, 1859, p. 18, pl. 1, figs. 1a-n; fig. 6, p. 20.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 81, fig. 3, i, 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 478, fig. 1787.

*Blastoidocrinus carcharidens* Miller, N. A. Geol. Pal., 1889, p. 229, text fig. 257.—Hudson, Bull. New York State Mus., 107, 1907, p. 97, figs. 1, 2; pls. 1-7; p. 149, 1911, pls. 1-4.

Chazyan: Caughnawaga, Islands of Montreal, Jesus, and Bizard, Canada; Valcour Island, New York (Valcour).

**BLASTOPHYCUS** Miller and Dyer. Genotype: *B. diadematum* Miller and Dyer.

*Blastophycus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 24.—Miller, N. A. Geol. Pal., 1889, p. 109.

**Blastophycus diadematum** Miller and Dyer.

*Blastophycus diadematum* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 24, pl. 1, figs. 1, 2.—Miller, N. A. Geol. Pal., 1889, p. 109, fig. 17.

Eden (Economy): Cincinnati, Ohio, and vicinity.

**BLOTHOPHYLLUM** Billings.

Genotype: *B. decorticatum* Billings.

*Blothrophyllum* Billings, Canadian Jour., n. s., 4, 1859, p. 129.—Nicholson, Canadian Nat., n. s., 7, 1874, p. 139; Rep. Pal. Prov. Ontario, pt. I, 1874, p. 18.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 112.—Miller, N. A. Geol. Pal., 1889, p. 174.—Sherzer, Amer. Geol., 7, 1891, pp. 284-289.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 171.

**Blothrophyllum cæspitosum** Rominger.

*Blothrophyllum cæspitosum* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 114, pl. 42.

Niagaran: Point Detour, Michigan.

**Blothrophyllum cinctosum** Greene.

*Blothrophyllum cinctosum* Greene, Contr. Indiana Pal., 2, pt. 2, 1906, p. 34, pl. 7, figs. 7, 8.

Niagaran (Louisville): Near Louisville, Kentucky.

**Blothrophyllum niagarense** Davis.

*Blothrophyllum niagarense* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 99, fig. 10.

Niagaran (Louisville): Near Louisville, Kentucky.

**BLUMENBACHIUM** Roemer. See *Astræospongia* Roemer.**BLUMENBACHIUM MENISCUS** Roemer. See *Astræospongia meniscus*.**BODMANIA** Miller and Faber.

Genotype: *B. insuetum* Miller and Faber.

*Bodmania* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 22.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 780.

Observation.—Probably the same as *Cyrtodonta*.

**Bodmania insuetum** Miller and Faber.

*Bodmania insuetum* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 23, pl. 1, figs. 5-7.

Richmond (Whitewater): Richmond, Indiana.

**BODMANIA VENTRICOSA** Miller and Faber. See *Whitella ventricosa*.



- BOLBOCEPHALUS** Whitfield. Genotype: *Bathyrurus seelyi* Whitfield.  
*Bolbocephalus* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1890, p. 36.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 705.
- Bolbocephalus seelyi*** (Whitfield).  
*Bathyrurus?* *Seelyi* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 339, pl. 33, fig. 12-18.  
*Bolbocephalus* *Seelyi* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, pl. 3, figs. 1-8.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 57, figs. 1-3.  
 Canadian (Beekmantown): Fort Cassin, Vermont, and Beekmantown, New York.
- Bolbocephalus? truncatus*** Whitfield.  
*Bolbocephalus? truncatus* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 37, pl. 2, figs. 6-8.  
 Canadian (Beekmantown): Fort Cassin, Vermont.
- BOLBOPORITES** Pander. Genotype: *B. mitralis* Pander.  
*Bolboporites* Pander, Beitrag zur Geognosie Russlands, 1830, p. 106.—Edwards and Haime, Mon. d. Polyp. Foss. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 246.—Eichwald, Leth. Rossica, 1, sect. 1, 1860, p. 495.—Miller, N. A. Geol. Pal., 1889, p. 174.
- Bolboporites americanus*** Billings.  
*Bolboporites americanus* Billings, Canadian Nat. Geol., 4, 1859, p. 429, figs. 3-6; Geol. Surv. Canada, 1863, p. 124, fig. 124a-d.—Chapman, Canadian Jour., n. s., 8, 1863, p. 195, fig. 165b; Expos. Min. Geol. Canada, 1864, p. 167, fig. 165b.—Miller, N. A. Geol. Pal., 1889, p. 174, fig. 140.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 11, pl. 1, fig. 1.  
 Chazy: Montreal and Mingan Islands, Canada; New York; Rysedorph Hill, Rensselaer County, New York (Rysedorph).
- BOLIVIANA** Salter. Genotype: *B. melocactus* Salter.  
*Boliviana* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71.
- Boliviana bipennis*** Salter.  
*Boliviana bipennis* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 72, pl. 5, fig. 11.  
 Ordovician(?): Valley of Unduavi, Bolivia.
- Boliviana melocactus*** Salter.  
*Boliviana melocactus* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, fig. 9.  
 Ordovician(?): Valley of Aceromarka, Bolivia.
- Boliviana proboscidea*** Salter.  
*Boliviana proboscidea* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, fig. 10.  
 Ordovician(?): Valley of Aceromarka, Bolivia.
- BOLLIA** Jones and Holl. Genotype: *B. bicollina* Jones and Holl.  
*Bollia* Jones and Holl, Ann. Mag. Nat. Hist., 5th ser., 17, 1886, p. 360.—Krause, Zeits. d. d. geol. Gesell., 41, 1889, p. 13.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 705.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 668.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40, fig. 26D.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Grabau, Bull. New York State Mus., 45, 9, 1901, p. 219.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 219.—Bonnema, Mitt. Min. Geol. Inst. Groningen, 2, 1909, p. 57.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 351.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 738.



*BOLLIA CLARKEI* Ulrich. See *Klædenella clarkei*.

***Bollia cornucopiæ* Ruedemann.**

*Bollia cornucopiæ* Ruedemann, Bull. New York State Mus., 49, 1901, p. 82, pl. 6, figs. 1, 2.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

*BOLLIA HALLI* Ulrich. See *Klædenella halli*.

***Bollia lata* Jones.**

*Beyrichia lata* Hall (part), Pal. New York, 2, 1852, p. 301, pl. A 66, fig. 10b (not figs. 10c-e=*Beyrichia lata*).

*Bollia lata* Jones, Amer. Geol., 4, 1889, p. 339.—Grabau and Shimer N. A. Index Fossils 2, 1910, p. 352.

Clinton: New York, Pennsylvania, Maryland, etc.

***Bollia lata brasiliensis* Clarke.**

*Bollia lata* var. *brasiliensis* Clarke, Archivos. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 22, pl. 2, figs. 30, 31.—Katzner, Grundz. d. Geol. d. unt. Amazonas, Leipzig, 1903, pl. 16, fig. 18a, b.

Silurian: Rio Trombetas, Brazil.

***Bollia persulcata* (Ulrich).**

*Beyrichia persulcata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 12, pl. 7, fig. 6.

*Bollia persulcata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 116, figs. 3a-d.

*Beyrichia buchiana* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 16, pl. 3, fig. 25.

Eden, Maysville, and Richmond: Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 41524, U.S.N.M.

***Bollia pumila* Ulrich.**

*Bollia pumila* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 117, pl. 12, figs. 1a, 1b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1042, pl. 53, figs. 12, 12a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 351, figs. 1660z, z'.

Richmond (Waynesville): Weisberg, etc., Indiana; Waynesville, etc., Ohio.

*Holotype*.—Cat. No. 41691, U.S.N.M.

***Bollia regularis* (Emmons).**

*Beyrichia regularis* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 219, fig. 74b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 91, fig.

*Bollia regularis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669 (gen. ref.).—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 288, figs. 12-14.

Richmond (Arnheim): Waynesville, etc., Ohio; Indiana; Kentucky.

*Plesiotypes*.—Cat. No. 41516, U.S.N.M.

***Bollia semilunata* Jones.**

*Bollia semilunata* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 548, pl. 21, figs. 9, a, b.

Richmond (Charleton and English Head): South of Junction Cliff, etc. Anticosti.

***Bollia subæquata* Ulrich.**

*Bollia subæquata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669, pl. 46, figs. 26-29.

Trenton (Prosser): Cannon Falls, St. Paul, etc., Minnesota.

*Cotypes*.—Cat. Nos. 41519, 41520, U.S.N.M.

*BOLLIA SYMMETRICA* of authors. See *Klœdenella symmetrica*.

*BOLLIA TYPA* Miller. See *Dilobella typa*.

***Bollia unguloidea* Ulrich.**

*Bollia unguloidea* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669, pl. 46, figs. 23-25.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 351, fig. 1658, 10, 10'.

Trenton (Prosser): Goodhue County, Minnesota.

**BOREASTER** Lambe.

Genotype: *B. lowi* Lambe.

Boreaster Lambe, Cruise of the Neptune in 1903-4, App. 4, 1906, p. 323.

**Boreaster lowi** Lambe.

Boreaster lowi Lambe, Cruise of the "Neptune" in 1903-4, App. 4, 1906, p. 323. Niagaran: Beechy Island, Lancaster Sound, Arctic America.

**BOTRYOCRINITES** of authors. See *Botryocrinus* Angelin.

**BOTRYOCRINUS** Angelin.

Genotype: *B. ramossissimus* Angelin.

*Botryocrinus* Angelin, Icon. Crin. Suec., 1878, 24, pl. 20, fig. 8; pl. 23, fig. 14.—Zittel, Handb. Pal., 1, 1879, p. 352.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 320 (Rev. Pal., pt. 1, p. 97); *ibid.*, 1886, pp. 112, 115, 148 (Rev. Pal., pt. 3, sec. 2, pp. 188, 191, 224); *ibid.*, 1890, p. 380.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 30; pl. 15, figs. 9, 13; 7, 1891, p. 392; Kongl. Sv. Vet.-Akad. Handl., 25, No. 2, 1893, p. 116, pl. 5, fig. 160; pl. 6, fig. 193; Nat. Science, 12, 1898, p. 342.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 65, fig. 34.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 179, fig. 97.—Springer, Amer. Geol., 26, 1900, p. 133.—Bather, *ibid.*, p. 308.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 157.—Zittel, Grundzuge Pal., 1, 1910, p. 154.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 506.

*Botryocrinites* Bather, Kongl. Sv. Vet.-Akad. Handl., 25, No. 2, 1893, pp. 114, 119, fig. 17.

*Sicyocrinus* Angelin, Icon. Crin. Suec., 1879, p. 23, pl. 4, fig. 9; pl. 16, fig. 5.—Wachsmuth and Springer, Rev. Pal., 1, 1879, pp. 62, 99.—Zittel, Handb. Pal., 1, 1879, p. 352.

**Botryocrinus nucleus** (Hall).

*Dendrocrinus nucleus* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 15, figs. 7-9.

*Cyathocrinus nucleus* Hall, *ibid.*, mus. ed., 1879, p. 136, pl. 15, figs. 7-9; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 265, pl. 14, figs. 7-9.

*Homocrinus nucleus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 144 (Rev. Pal., 3, sec. 2, p. 220).

*Botryocrinus nucleus* Bather, Crinoidea Gotland, 1893, p. 104.

Niagaran (Waldron): Waldron, Indiana.

**Botryocrinus polyxo** (Hall).

*Cyathocrinus polyxo* Hall, Trans. Albany Institute, 4, 1863, p. 199; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 15, figs. 10-17; mus. ed., p. 135, pl. 15, figs. 10-17.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 310 (Rev. Pal., 1, p. 87).—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 264, pl. 14, figs. 10-17.

*Homocrinus polyxo* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 144 (Rev. Pal., pt. 1, p. 87).

**Botryocrinus polyxo**—Continued.

*Botryocrinus polyxo* Bather, *Crin. Gotland*, 1893, p. 105.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 66, pl. 14, fig. 12.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 506.

Niagaran: Waldron, Indiana (Waldron); Bridgeport, Illinois (Racine).

**BRACHIOSPONGIA** Marsh.

Genotype: *Scyphia digitata* Owen.

*Brachiospongia* Marsh, *Amer. Jour. Sci. and Arts*, 2d ser., 44, 1867, p. 88.—Hovey, *Trans. Kansas Acad. Sci.*, 3, 1875, p. 10; reprint, 1896, p. 111.—Roemer, *Leth. geog.*, 1, Theil, *Leth. Pal.*, Erste Lief, 1880, p. 319.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 9, 1886, pp. 246, 247.—Beecher, *Mem. Peabody Mus.*, Yale Univ., 2, 1889, pp. 1, 13.—Miller, N. A. *Geol. Pal.*, 1889, p. 155.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 14, pt. 1, 1891, p. 66.—Rauff, *Palæontographica*, 40, 1894, p. 272.—James, *Amer. Nat.*, 29, 1895, p. 542, fig. 5.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 17.

**Brachiospongia digitata** (Owen).

——— Troost, *Mem. Geol. Soc. France*, 3, 1838, p. 95, pl. 11, figs. 8–10.

*Scyphia digitata* Owen, 2d Rep. *Geol. Surv. Kentucky*, 1857, p. 111.—Hovey, *Trans. Kansas Acad. Sci.*, 3, 1875, p. 10; reprint, 1896, p. 111.

*Brachiospongia Lyonii* Marsh, *Amer. Jour. Sci. and Arts*, 2d ser., 44, 1867, p. 88.

*Brachiospongia Roemerana* Marsh, *Amer. Jour. Sci. and Arts*, 2d ser., 44, 1867, p. 88.—Hovey, *Trans. Kansas Acad. Sci.*, 3, 1875, p. 10, fig. 1; reprint, 1896, p. 112, fig. 1.—Roemer, *Leth. geog.*, 1, Theil, *Leth. Pal.*, Erste Lief, 1880, p. 319, fig. 61.

*Brachiospongia hoveyi* Marsh, *Trans. Kansas Acad. Sci.*, 1874, p. 344.

*Brachiospongia digitata* James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 9, 1886, p. 248.—Beecher, *Mem. Peabody Mus.*, Yale University, 2, 1889, p. 19, figs. 1–4; pl. 1, figs. 1, 2; pl. 2, figs. 1–7; pl. 3, figs. 1, 2; pl. 4, figs. 1–8.—Nettle-roth, *Kentucky Foss. Shells*, *Geol. Surv. Kentucky*, 1889, p. 29, pl. 25, fig. 3; pl. 36, figs. 1, 2.—Miller, N. A. *Geol. Pal.*, 1889, p. 155, fig. 92.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 14, pt. 1, 1891, p. 66, fig. 6.—Rauff, *Palæontographica*, 40, 1894, p. 272, figs. 52–55.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 17, fig. 26.

Trenton (Bigby): Near Bright's Mill, Franklin County, Kentucky; Davidson County, Tennessee.

**BRACHIOSPONGIA HOVEYI** Marsh. See *Brachiospongia digitata*.

**Brachiospongia laevis** Foerste.

*Brachiospongia* sp. Beecher, *Mem. Peabody Mus.*, 2, pt. 1, 1889, p. 19.

*Brachiospongia laevis* Foerste, *Bull. Sci. Lab. Denison Univ.*, 14, 1909, p. 300, pl. 8, fig. 2.

Maysville (Mount Hope): Near Paint Lick, Madison County, Kentucky.

**BRACHIOSPONGIA LYONII** Marsh. See *Brachiospongia digitata*.

**BRACHIOSPONGIA ROEMERANA** Marsh. See *Brachiospongia digitata*.

**Brachiospongia tuberculata** James.

*Brachiospongia tuberculata* James, *Palæontologist*, No. 4, 1879, p. 25.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 9, 1886, p. 248; 14, pt. 1, 1891, p. 67.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 14, 1909, pl. 10, fig. 5.

Richmond (Liberty): Seven miles west of Wilmington, Ohio.

**BRACHYASPIS** Salter.

Genotype: *Isotelus rectifrons* Portlock.

*Brachyaspis* Salter, *Mon. Brit. Tril.*, *Pal. Soc.*, 1866, p. 148.—Zittel, *Handb. Pal.*, 2, 1885, p. 609.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 28.—Raymond, *Trans. and Proc. Roy. Soc. Canada*, 5, 3d ser., sec. 4, 1912, p. 115.



**Brachyaspis alacer** (Billings).

*Asaphus alacer* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 26, fig. 9a.

*Brachyaspis alacer* Raymond, Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 119, pl. 2, fig. 3.

Richmond (Charleton) and Gamachian: Charleton Point, etc., Anticosti.

**Brachyaspis altilis** Raymond.

*Asaphus platycephalus* Billings (not Stokes), Cat. Sil. Foss. Anticosti, 1866, pp. 24, 26, fig. 9b.

*Brachyaspis altilis* Raymond, Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 119, pl. 2, figs. 4, 5; Bull. Victoria Mem. Mus., 1, 1913, p. 47, pl. 4, figs. 3, 7.

Richmond (Charleton): English Head, Anticosti.

**Brachyaspis notans** (Billings).

*Asaphus notans* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 24, fig. 8; p. 60.

*Brachyaspis notans* Raymond, Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 118, pl. 1, fig. 1.

Richmond (English Head): English Head, Anticosti.

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

**BRACHYMERUS** Shaler. See *Anastrophia* Hall.

**BRACHYMERUS REVERSUS** Shaler. See *Parastrophia reversa*.

**BRACHYPRION** Shaler. See *Stropheodonta* subgenus *Brachyprion*.

**BRACHYPRION VENTRICOSA** Shaler. See *Stropheodonta* (*Brachyprion*) *philomena*.

**BROCKOCYSTIS** Foerste.

Genotype: *Apiocystites tecumseth* Billings.

*Brockocystis* Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 468.

**Brockocystis clintonensis** (Parks).

*Lepadocystis clintonensis* Parks, Amer. Jour. Sci., 29, 1910, p. 404, figs. 1, 2.

*Brockocystis clintonensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 473.

Upper Medinan (Cataract): Forks of Credit River, Ontario.

**Brockocystis huronensis** (Billings).

*Apiocystites Huronensis* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 91, fig. 28.—Schuchert, Smiths. Misc. Coll., 47, 1904, p. 212.

*Brockocystis huronensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 473.

Upper Medinan (Cataract): Cabots Head, shore of Lake Huron, Canada.

**Brockocystis tecumseth** (Billings).

*Apiocystites? Tecumseth* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 91.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 211.

*Brockocystis tecumsethi* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 469, pl. 5, fig. 2.

Upper Medinan (Cataract): Near South Bay, Manitoulin Island, Lake Huron.

**BRÖGGERIA** Walcott. See *Obolus* subgenus *Bröggeria*.

**BRONGNIARTIA** Eaton. See *Homalonotus* Koenig.

**BRONGNIARTIA CARCINODEA** Eaton. See *Triarthrus becki*.

**BRONGNIARTIA ISOTELEA** Eaton. See *Isotelus gigas*.

**BRONGNIARTIA PLATYCEPHALA** Harlan. See *Homalonotus delphinocephalus*.

**BRONGNIARTIA TRENTONENSIS** Collie. See *Homalonotus trentonensis*.

**BRONTES** Goldfuss. See *Goldius Dekoninck*.

**BRONTEUS** Goldfuss. See *Goldius Dekoninck*.

**BRYOGRAPTUS** Lapworth.

Genotype: *B. kjerulfi* Lapworth.

*Bryograptus* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 164.—Tullberg, *Sveriges Geol. Unders.*, Ser. C, No. 55, 1883, p. 12.—Hermann, *Geol. Mag.*, dec. 3, 1886, p. 17.—Lapworth, *Trans. Royal Soc. Canada*, 4th ser., 1887, p. 168.—Nicholson and Marr, *Geol. Mag.*, dec. 4, 2, 1895, pp. 530, 531, fig.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 328.—Wiman, *Bull. Geol. Inst. Univ. Upsala*, 2, pt. 2, No. 4, 1896, p. 265.—Roemer and Frech, *Leth. geog.*, 1 Theil, *Leth. Pal.*, 1, 3 Lief., 1897, p. 583.—Elles, *Quart. Jour. Geol. Soc.*, London, 54, 1898, p. 472.—Elles and Wood, *Mon. Brit. Graptolites*, *Pal. Soc.*, 1902, p. 87.—Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, pp. 638, 639.

**BRYOGRAPTUS KJERULFI** Matthew. See *Staurograptus dichotomus*.

**BRYOGRAPTUS KJERULFI** Ruedemann. See *Bryograptus pusillus*.

**Bryograptus lapworthi** Ruedemann.

*Bryograptus* n. sp., Ruedemann, *Ann. Rep.*, New York State Pal., 1902, p. 556.

*Bryograptus lapworthi* Ruedemann, *Mem.*, New York State Mus., 7, pt. 1, 1904, pp. 639–641, pl. 5, figs. 1–12, fig. 47.

Canadian (Deepkill, *Tetragraptus* zone): Deepkill, Rensselaer County, New York.

**BRYOGRAPTUS LENTUS** Matthew. See *Staurograptus dichotomus*.

**BRYOGRAPTUS? MULTIRAMOSUS** Gurley. See *Dictyonema flabelliforme*.

**BRYOGRAPTUS PATENS** Matthew. See *Staurograptus dichotomus*.

**Bryograptus pusillus** Ruedemann.

*Bryograptus* Kjerulfi Ruedemann (not Lapworth), *Ann. Rep.* New York State Pal., 1902, p. 556.

*Bryograptus pusillus* Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, pp. 641, 642, pl. 4, figs. 21, 22.

Canadian (Deepkill, *Tetragraptus* zone): Deepkill, Rensselaer County, New York.

**Bryograptus spinosus** Matthew.

*Bryograptus spinosus* Matthew, *Trans. New York Acad. Sci.*, 14, 1895, p. 269, pl. 48, figs. 3a, b.—Gurley, *Jour. Geol.*, 4, 1896, p. 93.—Ruedemann, *Bull. New York State Mus.*, 69, 1903, p. 938 (loc. occ.).

Canadian (Bretonian-Div. C 3c): St. John, New Brunswick.

Observation.—Possibly the same as *Staurograptus dichotomus* Emmons.

**BUCANELLA** Meek.

Genotype: *B. nana* Meek.

*Bucanella* Meek, *Proc. Amer. Phil. Soc.*, 11, 1870, p. 426.—Miller, *N. A. Geol. Pal.*, 1889, p. 298.—Koken, *Neues Jahrb. f. Min., Geol. Pal.*, Beilage-Band 6, 1889, p. 390.

*Bucaniella* Koken, *Die Leitfossilien*, Leipzig, 1896, pp. 100, 392, 558; *Neues Jahrb. f. Min., Geol. Pal.*, 1, 1896, pp. 6, 10.—Clarke, *Archives Mus. Nac. Rio de Janeiro*, 10, author's Eng. ed., 1900, p. 36.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 612.

**BUCANELLA** Koken (part). See *Kokenospira* Bassler, and *Tetranota* Ulrich and Scofield.

**Bucanella nana** Meek.

*Bucanella nana* Meek, Proc. Amer. Phil. Soc., 11, 1870, p. 426.

Lower Ordovician: Crater's Falls, Colorado.

**Bucanella trilobata** (Conrad).

*Planorbis trilobatus* Conrad, Ann. Rep. New York State Geol. Surv., 1838, p. 113.

*Bellerophon trilobatus* Hall, Geol. Rep. 4th Dist. New York, 1843, p. 48, figs. 6, 7; pl. 2, figs. 6, 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 88, figs.

*Bucanella trilobatus* Hall, Pal. New York, 2, 1852, p. 13, pl. 4 (bis), figs. 5a, b, and part of 3d; p. 93, pl. 28, figs. 10a, b.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 822, fig. 624.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 5, figs. 6, 7.—Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 103, pl. 8, figs. 33a, b.—Grabau, Bull. New York State Mus., 45, 1901, p. 213, fig. 144.

*Bellerophon* (*Bucania*) *trilobatus* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 549, pl. 27, figs. 33a, b.

*Bucaniella trilobata* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 36 (gen. ref.).

Upper Medinan and Clinton: Lockport, Medina, etc., New York; Ontario; Arisaig, Nova Scotia.

**Bucanella trilobata viromundo** (Clarke).

*Bucaniella trilobata* var. *viro-mundo* Clarke, Archivos Mus. Nac. Rio de Janeiro, author's Eng. ed., 1900, p. 18, pl. 2, figs. 20-22.

Silurian: Rio Trombetas, Brazil.

**BUCANIA** (part) of authors. See *Tetranota* Ulrich and Scofield, *Salpingostoma* Roemer, and *Bucanopsis* Ulrich.

**BUCANIA** Hall.

Genotype: *Bellerophon sulcatus* Emmons.

*Bucania* Hall, Pal. New York, 1, 1847, p. 32.—Verneuil, Bull. Soc. Geol. France, 2d ser., 5, 1848, p. 376, footnote.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 66; 14th Rep., 1861, p. 93.—Meek, Proc. Chicago Soc. Nat. Hist., 1, 1866, p. 11.—Miller, Cincinnati Quart. Jour. Sci., 1874, p. 307.—Hall, Pal. New York, 5, pt. 2, 1879, p. 121.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1880, 1, p. 130, 150.—Zittel, Handb. Pal., 2, 1882, p. 184.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 8, 1883, p. 148.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 159.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, pp. 379, 385.—Miller, N. A. Geol. Pal., 1889, p. 398.—Barrois, Ann. Soc. Geol. du Nord, 19, Lille, 1891, p. 216.—Koken, Die Leitfossilien, Leipzig, 1896, p. 100, text fig. 78, fig. 1; Bull. l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 120.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 850.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 6.—Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 35.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 213; Bull. New York State Mus., 45, 1901, p. 213.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 52.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 948.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 613.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 521.

**BUCANIA ANGUSTATA** Hall. See *Tremanotus angustata*.



**Bucania bellapuncta** Hall.

Bucania bellapuncta Hall, Pal. New York, 2, 1852, p. 93, pl. 28, fig. 9.  
Lower Clinton: Walcott, New York.

BUCANIA (BELLEROPHON) BIDORSATA Hall. See *Tetranota bidorsata*.

BUCANIA BUELLI Whitfield. See *Salpingostoma buelli*.

BUCANIA (TREMANOTUS) BUELLI Whitfield. See *Salpingostoma buelli*.

BUCANIA CATILLOIDES Raymond. See *Oxydiscus catilloides*.

BUCANIA CHAMPLAINENSIS Whitfield. See *Bucania sulcatina*.

BUCANIA CHICAGOENSIS McChesney. See *Tremanotus chicagoensis*.

BUCANIA COSTATUS Miller. See *Dyeria costata*.

**Bucania crassa** Ulrich.

Bucania crassa Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 893, pl. 67, figs. 46-48.—  
Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 955, pl. 39,  
figs. 4-4b.

Richmond (Elkhorn): Near Richmond, Indiana.

*Holotype*.—Cat. No. 45714, U.S.N.M.

BUCANIA CRASSOLARE McChesney. See *Tremanotus crassolaris*.

**Bucania cyclostoma** Calvin.

Bucania cyclostoma Calvin, Bull. Lab. Nat. Hist. State Univ. Iowa, 1, 1890, p.  
181, pl. 1, figs. 2a, b.

Niagaran: Maquoketa, Iowa.

**Bucania elliptica** Ulrich and Scofield.

Bucania elliptica Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 888,  
pl. 66, figs. 11 and 12.

Trenton (Prosser): Near Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 45715, U.S.N.M.

**Bucania emmonsii** Ulrich and Scofield.

Bucania emmonsii Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 887,  
pl. 66, figs. 1-3.

Black River (Platteville): Cannon Falls and Fountain, Minnesota.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Cotypes*.—Cat. Nos. 46049, 46050, U.S.N.M.

**Bucania euomphaloides** Owen.

Not recognized.

Bucania euomphaloides Owen, Geol. Surv. Indiana, 1862, p. 362, fig. 3.

Silurian: Locality not given.

**Bucania exigua** Foerste.

Bucania exigua Foerste, Bull. Sci. Lab. Denison Univ., 1, 1884, p. 99, pl. 13,  
figs. 18a-d.

Bellerophon (Bucania) exigua Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889,  
p. 288, pl. 6, fig. 3; Geol. Surv. Ohio, Pal., 7, 1893, p. 548, pl. 25, figs. 18a-b;  
pl. 31, fig. 3; pl. 37A, figs. 2a-c.

Bellerophon exiguus Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 619.—  
Savage, Bull. Illinois Geol. Surv., 23, 1913, p. 99, pl. 6, fig. 6.

Upper Medinan: Dayton and Todds Fork, Ohio; Hanover, Indiana (Brassfield);  
Pike County, Missouri (Edgewood).

BUCANIA EXPANSA Hall. See *Salpingostoma expansa*.

**Bucania fiscellostriata** (Foerste).

Bellerophon fiscello-striatus Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 99, pl. 13, figs. 19a-d; Proc. Boston Soc. Nat. Hist., 24, 1889, p. 287; Geol. Surv. Ohio, Pal., 7, 1893, p. 548, pl. 25, figs. 19a-e.  
Upper Medinan (Brassfield): Near Dayton, Ohio.

**Bucania frankfortensis** Ulrich.

Bucania frankfortensis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 891, pl. 66, figs. 30-33.  
Trenton (Cynthiana): Frankfort, Kentucky.  
*Holotype*.—Cat. No. 45716, U.S.N.M.

**Bucania halli** Ulrich and Scofield.

Bucania halli Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 886, pl. 66, figs. 4-8.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 614, fig. 822.  
Black River: Cannon Falls, Minnesota (Platteville); Lincoln County, Missouri (Auburn); Mercer County, Kentucky (Lowville).  
*Cotypes*.—Cat. Nos. 45717, 45718, U.S.N.M.

BUCANIA IMBRICATA Miller. See Salpingostoma imbricata.

**Bucania intexta** Hall.

Bucania intexta Hall, Pal. New York, 1, 1847, p. 217, pl. 33, figs. 4a-d.  
Bellerophon intextus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 166.  
Trenton: Near Watertown, New York.

**Bucania lindsleyi** (Safford).

Bellerophon lindsleyi Safford, Geol. Tennessee, 1869, pl. 3 (G), figs. 3a, b, d, e.  
Bucania lindsleyi Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 889, pl. 66, figs. 24 and 25.  
Trenton: Dekalb County, Tennessee (Catheys): Near Cannon Falls, Minnesota (Prosser).  
*Holotype*.—Cat. No. 45719, U.S.N.M.

**Bucania micronema** Ulrich.

Bucania micronema Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 892, pl. 66, figs. 26-29.  
Trenton (Flanagan): Danville, Kentucky.  
*Holotype*.—Cat. No. 45720, U.S.N.M.

**Bucania minnesotensis** Ulrich and Scofield.

Bucania minnesotensis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pl. 66, figs. 9 and 10.  
Black River (Platteville): Goodhue County, Minnesota.  
*Holotype*.—Cat. No. 45721, U.S.N.M.

**Bucania nana** Ulrich.

Bucania nana Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 895, pl. 66, figs. 41-44.  
Trenton: Near Burgin (Flanagan) and Covington, Kentucky.  
*Cotypes*.—Cat. No. 45722, U.S.N.M.

**Bucania nana subpatula** Ulrich.

Bucania nana var. subpatula Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 896, pl. 66, figs. 45, 46.  
Trenton: Near Burgin (Flanagan) and Covington, Kentucky.  
*Holotype*.—Cat. No. 45723, U.S.N.M.

**Bucania nashvillensis** Ulrich.

*Bucania nashvillensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 890, pl. 66, figs. 36-40.

Trenton (Catheys): Dekalb County and Nashville, Tennessee.

*Cotypes*.—Cat. Nos. 45724, 45725, U.S.N.M.

**BUCANIA OBSOLETA** Miller. See *Tetranota obsoleta*.

**Bucania operta** (Foerste).

*Bellerophon* (*Bucania*) *opertus* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 548, pl. 25, figs. 18c-d; pl. 37A, figs. 3a, b.

Upper Medinan (Brassfield): Near Dayton, Ohio, and Hanover, Indiana.

**Bucania peracuta** Ulrich.

*Bucania peracuta* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 896, pl. 66, figs. 34, 35.

Trenton (Catheys): Dekalb County, Tennessee.

*Holotype*.—Cat. No. 45726, U.S.N.M.

**Bucania perornata** Calvin.

*Bucania perornata* Calvin, Bull. Lab. Nat. Hist., State Univ. Iowa, 1, 1890, p. 180, pl. 3, figs. 3a, b.

Niagaran: Maquoketa, Iowa.

**BUCANIA PERVOLUTA** McChesney. See *Tremanotus pervolutus*.

**BUCANIA PUNCTATA** Lincklaen. See *Bucania punctifrons*.

**Bucania punctifrons** (Emmons).

*Bellerophon punctifrons* Emmons, Geol. Rep. 2d Dist. New York, 1842, p. 392, fig. 5.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 369, fig. 5.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 165, pl. 12, figs. 11a, 12; Manual Geol., 1860, p. 98, fig. 87.—Lesley, Geol. Surv. Pennsylvania, Rep. P. 4, 1889, p. 87, figs.

*Bucania punctifrons* Hall, Pal. New York, 1, 1847, p. 187.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 894, pl. 67, figs. 41-44.—Raymond, Bull. Amer. Pal., 3, 1902, pl. 19, figs. 9, 10.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 177, pl. 12, figs. 10-12.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 614.

*Bucania punctata* Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 2, fig. 5.

*Retepora foliacea* Hall, Pal. New York, 1, 1847, p. 78, pl. 26, figs. 9a, b.

Trenton: Middleville, Watertown, etc., New York; Canada; Central Tennessee; New Jersey.

*Plesiotypes*.—Cat. No. 45727, U.S.N.M. (Ulrich and Scofield).

**BUCANIA RICHMONDENSIS** Miller. See *Salpingostoma richmondensis*.

**BUCANIA ROTUNDATA** Hall. See *Bucania sulcatina*.

**Bucania rugatina** Ulrich.

*Bucania rugatina* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 890, pl. 66, figs. 13-15.

Trenton (Flanagan): Near Burgin, Kentucky.

*Holotype*.—Cat. No. 45728, U.S.N.M.

**BUCANIA RUGOSA** Lesley. See *Bellerophon rugosa*.

**BUCANIA SCULPTILIS** Miller. See *Salpingostoma sculptilis*.



***Bucania simulatrix* Ulrich.**

*Bucania simulatrix* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 892, pl. 63, figs. 48, 49; pl. 67, fig. 45.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 955, pl. 42, figs. 9, 9a.

Richmond (Whitewater): Richmond, Indiana.

***Bucania singularis* Ulrich.**

*Bucania singularis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 894, pl. 66, fig. 47.

Trenton (Catheys): Nashville, Tennessee.

*Holotype*: Cat. No. 45730, U.S.N.M.

*BUCANIA STIGMOSA* Whiteaves. See *Bellerophon shelbiensis*.

***Bucania stigmosa* Hall.**

*Bucania stigmosa* Hall, Pal. New York, 2, 1852, p. 92, pl. 28, figs. 8a-e.

Lower Clinton: Lockport, New York.

***Bucania subangulata* Ulrich.**

*Bucania subangulata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 891, pl. 66, figs. 20-23.

Trenton (Flanagan): Mercer and Boyle Counties, Kentucky.

*Cotypes*.—Cat. No. 45731, U.S.N.M.

***Bucania sublata* Ulrich and Scofield.**

*Bucania sublata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 888, pl. 66, figs. 16-19.

Trenton: Near Burgin, Kentucky (Flanagan); Wykoff, Minnesota (Prosser).

Black River (Decorah): Near Fountain and Minneapolis, Minnesota.

*Cotypes*.—Cat. Nos. 45732, 45733, U.S.N.M.

***Bucania sulcatina* (Emmons).**

*Bellerophon sulcatus* Emmons, Geol. Nat. Hist. New York, 2, 1842, p. 312, fig. 4.—Owen, Amer. Jour. Sci., 47, 1844, p. 358, fig. 4, p. 359.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 165, pl. 4, fig. 4; Manual Geol., 1860, p. 93, fig. 78 only.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 146, fig. 96a, b.

*Bellerophon* (*Bucania*) *sulcatus* Salter, Quart. Jour. Geol. Soc. London, 1854, 10, p. 74.

*Bucania sulcatina* Hall, Pal. New York, 1, 1847, p. 32, pl. 6, figs. 10, 10a; pl. 33, fig. 4d.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 1, figs. 4, 5.—Waagen, Pal. Indica, 13th ser., pt. 2, 1880, p. 131.—Miller, N. A. Geol. Pal. 1889, p. 398, fig. 656.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band 6, 1889, p. 379.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 97, figs.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 322 (loc. occ.).—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 850, 883.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 9.—Raymond, Ann. Carnegie Mus., 4, 1908, p. 194, pl. 49, figs. 15-17; pl. 50, figs. 3, 4; pl. 55, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 613, figs. 820, 821.

*Bucania rotundata* Hall, Pal. New York, 1, 1847, p. 33, pl. 6, figs. 11a-c.

*Bellerophon rotundatus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 165.

*Megalomphala?* *rotundata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 850 (gen. ref.).

*Bucania champlainensis* Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 181, pl. 4, figs. 14-16.—Raymond, Bull. Amer. Pal., 3, 1902, p. 305, pl. 18, figs. 7, 8.

Chazy (Day Point-Valcour): Chazy, Plattsburgh, etc., New York; Vermont: East Tennessee; Isle La Motte, Vermont.

Middle Stones River: Chambersburg, Pennsylvania, etc.

*Plesiotypes*.—Cat. No. 53635, U.S.N.M.

**BUCANIA TRIGONOSTOMA** Whitfield. See *Tremanotus? trigonostoma*.

**BUCANIA TRILOBATA** Clarke. See *Bucanella trilobata*.

**Bucania tripla** Whitfield.

*Bucania tripla* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 55, pl. 9, figs. 12, 13.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 60, fig. 7.

Canadian (Beekmantown): Providence Island, Lake Champlain.

**BUCANIELLA** Koken. See *Bucanella* Meek.

**BUCANOPSIS** Ulrich.

Genotype: *B. carinifera* Ulrich.

*Bellerophon* (part) of authors prior to 1884.

*Bucania* (part) Waagen, Pal. Indica, 13th ser., pt. 2, 1880, pp. 130 and 150.—Koken, N. Jahrb. f. Min., etc., Beilage Band, 6, 1889, p. 379.

*Bucanopsis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pp. 853–922.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 622.

**Bucanopsis carinifera** Ulrich.

*Bucanopsis carinifera* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 925, pl. 62, figs. 56–61.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 622, fig. 836.

Trenton (Flanagan): Near Danville, Kentucky; Maysville (Fairmount); Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 45734, U.S.N.M.

**BUCANOSPIRA** Ulrich.

Genotype: *B. expansa* Ulrich.

*Bucanospira* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044.

**Bucanospira expansa** Ulrich.

*Bucanospira expansa* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044, figs. 9a–c. Niagaran (Brownsport): Wayne County, Tennessee.

*Cotypes*.—Cat. No. 45735, U.S.N.M.

**BUMASTUS** Murchison.

Genotype: *B. barriensis* Murchison.

*Bumastus* Murchison, Sil. Syst., 1839, p. 656.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 540, 552.—Salter, Mem. Geol. Surv. United Kingdom, dec. 2, 1849, pls. 3, 4.—McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 399.—Salter, Mon. British Tril., Pal. Soc., 1867, p. 183.—Steinhardt, Beit. z. Naturk. Preus. Phys.-Oekon. Gesell., Königsberg, 1874, p. 52.—Angelin, Pal. Scandinavica, 3d ed., Holmiæ, 1878, p. 40.—Holm, Bihang K. Svenska Vet.-Hand., 7, 1882, pp. 12, 16.—Zittel, Handb. Pal., 2, Munich, 1885, p. 612.—Holm, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1886, pp. 18, 21, 42.—Koken, Die Leitfossilien, Leipzig, 1896, p. 28.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, pp. 26, 45.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297.—Slocum, Field Mus. Nat. Hist., Geol. Ser. 4, 1913, p. 54.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 720.

**Bumastus armatus** (Hall).

*Illænus armatus* Hall, adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 26, figs. 3, 4; 20th Rep. 1867, p. 330, pl. 22, figs. 1–3, figs. 3–4; (rev. ed.), 1870, p. 418, figs. 8, 9, pl. 22, figs. 1–3, pl. 25, fig. 22; also p. 433; 28th Rep. New York State Mus. Nat. Hist. (doc. ed.), 1877, pl. 32, figs. 19–20; 1879, Mus. ed., p. 189, pl. 32, figs. 19, 20; 11th Rep. Dep. Geol. and Nat. Hist. Indiana, 1882, p. 335, pl. 34, figs. 19–20, pl. 33, fig. 12.—Kindle and Breger 28th Rep., ibid., 1904, p. 479, pl. 22, fig. 6.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 222, pl. 18, figs. 4–6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297, fig. 1609.



**Bumastus armatus**—Continued.

*Illænus* (*Bumastus*) *armatus* Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 209, fig. 54.

*Illænus* (*Bumastus*) *worthenanus* Winchell and Marcy, Mem., Boston Soc. Nat. Hist., 1, 1865, p. 105, 109.

Niagaran: Bridgeport, Illinois; Racine, etc., Wisconsin (Racine); Waldron, Indiana (Waldron); Georgetown and Wabash, Indiana.

**BUMASTUS BARRIENSIS** Hall. See *Bumastus ioxus*.

**Bumastus beckeri** Slocum.

*Bumastus beckeri* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 54, pl. 14, figs. 1-4.

Richmond (Maquoketa): Clermont, Iowa.

**Bumastus bellevillensis** Raymond and Narraway.

*Bumastus bellevillensis* Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 253, pl. 61, figs. 6, 7.

Trenton: Belleville, Canada.

**Bumastus billingsi** Raymond and Narraway.

Cf. *Bumastus trentonensis* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 290, fig. 1.

Cf. *Illænus trentonensis* Hall, Pal. New York, 1, 1847, p. 230, pl. 60, fig. 5.

Cf. *Bumastus orbicaudatus* Clarke, Geol. Minnesota, 3, 1897, p. 722, fig. 36.

*Bumastus billingsi* Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 250, pl. 61, figs. 1, 2.—Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 34, pl. 3, fig. 12.

Trenton: Hull, Quebec, and vicinity.

Observation.—See Raymond and Narraway (1908) for a discussion of the synonyms of this species.

**Bumastus chicagoensis** (Weller).

*Illænus chicagoensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 220, pl. 16, figs. 10-12.

Niagaran (Racine): Bridgeport, Illinois.

**Bumastus cuniculus** (Hall).

*Illænus cuniculus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 377, pl. 22, fig. 12; rev. ed., 1870, p. 421, pl. 22, fig. 12.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 219, pl. 19, figs. 1-6.

Niagaran (Racine): Hawthorne, Illinois; Wauwatosa, Wisconsin.

**Bumastus elongatus** Weller.

*Bumastus elongatus* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 195, pl. 14, fig. 15.

Trenton: Near Springdale, New Jersey.

**Bumastus erastusi** (Raymond).

*Illænus erastusi* Raymond, Ann. Carnegie Mus., 3, 1905, p. 351, pl. 13, figs. 8, 9.

*Bumastus erastusi* Raymond, Ann. Carnegie Mus., 7, 1910, p. 71; 7th Rep. State Geol. Vermont, 1910, p. 229, pl. 35, figs. 8, 9.

*Illænus crassicauda*? Hall, Pal. New York, 1, 1847, p. 24, pl. 4 bis, fig. 13.

Chazy: Valcour Island and Chazy, New York; Isle La Motte, Vermont (Crown Point, Valcour); Mingan Islands, Canada (Mingan).

**Bumastus globosus** (Billings).

*Illænus globosus* Billings, Canadian Nat. Geol., 4, 1859, p. 367, figs. 1-3; Geol.

Canada, Geol. Surv. Canada, 1863, p. 133, figs. 64, a-c.—Miller, N. A. Geol.

Pal., 1889, p. 551, text figs. 1015-16.—Raymond, Annals Carnegie Mus.,

1905, p. 350, pl. 13, figs. 6, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 294, figs. 1605, a. c.



**Bumastus globosus**—Continued.

- Bumastus globosus* Raymond, Ann. Carnegie Mus., 7, 1910, p. 71, pl. 19, fig. 9; 7th Rep. State Geol. Vermont, 1910, p. 228, pl. 35, figs. 6, 7; pl. 39, fig. 9; Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 120, pl. 3, fig. 3.  
**Chazyan:** Mingan Islands (Mingan); Island of Montreal; Chazy, Valcour Island, Plattsburg, and Crown Point, New York; Isle La Motte, Vermont (Day Point, Valcour); East Tennessee (Lenoir).

**Bumastus graftonensis** (Meek and Worthen).

- Illænus* (*Bumastus*) *griftonensis* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1870, p. 54; Geol. Surv. Illinois, 7, 1875, p. 508, pl. 25, fig. 4.  
*Illænus graftonensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 223, pl. 16, figs. 4-6.—Keyes, Missouri Geol. Surv., 4, 1894, p. 226.  
**Niagaran:** Grafton, Joliet, and near Lemont, Illinois (Racine).

**Bumastus harrisi** (Weller).

- Illænus harrisi* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 218, pl. 16, figs. 1-3.  
**Niagaran** (Racine): Bridgeport, Illinois.

**Bumastus imperator** (Hall).

- Illænus imperator* Hall, Rep. Prog. Geol. Surv. Wisconsin, 1861, p. 49; Geol. Surv. Wisconsin, 1, 1862, p. 433; adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1865, p. 28; 20th Rep., 1867, p. 332, pl. 22, figs. 15-17; pl. 23, figs. 2-3; rev. ed., 1870, p. 420, pl. 22, figs. 15-17; pl. 23, figs. 2-3.—Whitfield, Geol. Wisconsin, 4, 1882, p. 306, pl. 21, figs. 4-5.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 225, pl. 16, figs. 13-16.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297.  
**Niagaran** (Racine): Racine, Waukesha and Burlington, Wisconsin; Joliet, Illinois.

**Bumastus indeterminatus** (Walcott).

- Illænus indeterminatus* Walcott, 31st Rep. New York State Mus. Nat. Hist., 1879 (1880); adv. sheets 1877, pp. 19, 70.  
*Illænus cf. indeterminatus* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 716, fig. 24.  
*Bumastus indeterminatus* Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 253, pl. 62, figs. 8, 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297.  
**Black River:** Russia, New York; Mechanicsville, Ontario; Tetreauville, Quebec (Lowville); Platteville and Janesville, Wisconsin (Platteville).

**Bumastus insignis** (Hall).

- Illænus insignis* Hall, adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1865, p. 27, figs. 5, 6; 20th Rep., 1867, p. 331, figs. 5, 6; pl. 22, figs. 13, 14; rev. ed., 1870, p. 419, figs. 10, 11; pl. 22, figs. 13, 14.—Whitfield, Geol. Wisconsin, 4, 1882, p. 305, pl. 21, figs. 6-10.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Foerste, 15th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1887, p. 481.—Keyes, Missouri Geol. Surv., 4, 1894, p. 227, pl. 32, figs. 1 a-b.—Geol. Surv. Ohio, 7, 1895, p. 525, pl. 26, fig. 11.—Kindle, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 479, pl. 22, figs. 1-5.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 215, pl. 17, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 296, fig. 1608.  
*Illænus* (*Bumastus*) *insignis* Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 207, pl. 27, figs. 6, 7.  
*Bumastus insignis* Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 183 (gen. ref.).  
**Niagaran:** Waukesha, Milwaukee, Racine, etc., Wisconsin; Bridgeport, Illinois (Racine); Ohio and Indiana.

**Bumastus ioxus (Hall).**

*Bumastus barriensis* Hall (not Murchison), Geol. New York, pt. 4, 1843, p. 102, fig. 4; p. 101; tab. org. rem., 10, fig. 4, and 19, fig. 2.—Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 309, fig. 4.—Verneuil, Amer. Jour. Sci. and Arts, 2d ser., 7, 1849, p. 225.—Hall, Pal. New York, 2, 1852, p. 302, pl. 66, figs. 1-15.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 83, pl. 5, fig. 23.—Emmons, Man. Geol., 1860, p. 108, fig. 98.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 319, fig. 338.—Miller, N. A. Geol. Pal., 1889, p. 536, fig. 981.

*Illænus (Bumastus) barriensis?* Hall, Geol. Surv. Wisconsin, 1, 1862, p. 433; adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 28; 20th Rep. 1867, p. 332.

*Illænus barriensis* Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 8, fig. 5.—Hall, Trans. Albany Inst., 4, 1863, p. 227.

*Illænus ioxus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 387, fig.; pl. 22, figs. 4-11; pl. 23, fig. 1; rev. ed., 1870, p. 420, fig. 12, pl. 22, figs. 4-10.—Whitfield, Geol. Wisconsin, 4, 1882, p. 304, pl. 21, figs. 11, 12.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 299, figs.—Foerste, Proc. Bost. Soc. Nat. Hist., 24, 1889, p. 268, pl. 5, fig. 20.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.—Grabau, Bull. New York State Mus., 45, 1901, p. 223, fig. 154; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 223, fig. 154.—Kindle, 28th Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 480, pl. 22, fig. 7; pl. 23, fig. 3.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 222, pl. 18, figs. 1-3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 295, figs. 1606, 1607.

*Illænus (Bumastus) ioxus* Hall, Trans. Albany Inst., 10, 1883, p. 76; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 335, pl. 38, figs. 13, 14.

Niagaran: Rochester, Lockport, etc., New York; Hamilton, etc., Ontario (Rochester); Waldron, Indiana (Waldron); Racine, etc., Wisconsin; Illinois (Racine); Cedarville, etc., Wisconsin (Guelph); Indiana; Arkansas; Ohio; etc.

**Bumastus limbatus Raymond.**

*Bumastus limbatus* Raymond, Ann. Carnegie Mus., 7, 1910, p. 71; 7th Rep. Vermont State Geol., 1910, p. 230, pl. 35, figs. 1, 2.

*Illænus indeterminatus* Raymond (not Walcott) Ann. Carnegie Mus., 3, 1905, p. 347, pl. 13, figs. 1, 2.

Chazyan (Valcour): Valcour Island, New York, and Isle La Motte, Vermont.

**Bumastus milleri (Billings).**

Cf. *Illænus trentonensis* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 390, fig. 3.

Cf. *Bumastus trentonensis* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 718, figs. 30-35.—Weller, Pal. New Jersey, 3, 1902, p. 194, pl. 14, figs. 8-13.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 298, figs. 1610a, b.

*Illænus milleri* Billings, Canadian Nat. Geol., 4, 1859, p. 375, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, fig. 112.—Walcott, 31st Ann. Rep. New York State Mus. Nat. Hist., 1879, p. 71 (adv. sheets, 1877, p. 20).—Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 249, pl. 61, figs. 9, 10; pl. 62, figs. 3-5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297.

Black River: Ottawa, etc., Ontario; New York; New Jersey; etc.

Observation.—See Raymond and Narraway (1908) for a discussion of this and related species.

**Bumastus niagarensis (Whitfield).**

*Illænus niagarensis* Whitfield, Ann. Rep. Wisconsin Geol. Surv., 1880, p. 68.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 219, pl. 19, figs. 7-11.



**Bumastus niagarensis**—Continued.

- Bumastus niagarensis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 298.  
*Illænus madisonianus* Whitfield, Geol. Wisconsin, 4, 1882, p. 307, pl. 20, figs. 8, 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 106, pl. 14, figs. 1a, 1b, 2a-2b; 2, 1887, p. 93, pl. 8, figs. 8-10; Geol. Surv. Ohio, Pal., 7, 1893, p. 526, pl. 27, figs. 7-10.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.  
*Illænus madisonianus* vars. *elongatus* and *depressus* Foerste, Geol. Surv. Ohio, 7, 1893, p. 526, pl. 26, figs. 1, 2; pl. 27, figs. 7-10.  
 Niagaran: Wisconsin and Illinois (Racine); St. Clair Springs, Arkansas (St. Clair); Dayton, Ohio (Brassfield).

**Bumastus orbicaudatus** (Billings).

- Illænus orbicauda* Billings, Canadian Nat., 4, 1859, p. 379.  
*Illænus orbicaudatus* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 27, fig. 10; p. 60.—Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 209.  
 Richmond-Anticostian (English Head, Gun River): English Head, Gamache Bay, etc., Anticosti.

**BUMASTUS ORBICAUDATUS** Clarke. See *Bumastus billingsi*.

**Bumastus transversalis** Weller.

- Bumastus transversalis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 195, pl. 14, fig. 14.  
 Trenton: Hainesburg, New Jersey.

**Bumastus trentonensis** Emmons.

- Bumastus trentonensis* Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 390, fig. 1.  
*Illænus trentonensis* Hall, Pal. New York, 1, 1847, p. 230, pl. 69, fig. 5.  
 Trenton (drift): Hogsburg, New York.

Observation.—Type lost and figures not sufficient for accurate identification. See Raymond and Narraway (Annals Carnegie Mus., 4, 1908, p. 251) for a discussion of this and related forms.

**BUTHOGRAPTUS** Hall.

Genotype: *B. laxis* Hall.

- Buthograptus* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 18; 20th Rep. New York State Cab. Hist., 1868, p. 218; rev. ed., 1870, p. 252.—Nicholson, Mon. Brit. Grapt., 1872, p. 131.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 563.—Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 351 (*Bythochladus*, new name, suggested).  
*Bythograptus* Miller, N. A. Geol. Pal., 1889, p. 174.

**Buthograptus laxis** Hall.

- Buthograptus laxis* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 19; Geol. Surv. Canada, dec. 2, 1865, p. 18, fig. 25; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 185, fig. 27; rev. ed., 1870, p. 214, fig. 27.—Nicholson, Mon. Brit. Graptol., 1872, p. 132, fig. 72.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 153, fig.—Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 351, pl. 11, figs. 1-3; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 40, pl. 4, figs. 1-3.  
 Black River (Platteville): Platteville, etc., Wisconsin.

**BUTHOTREPHIS** Hall.

Genotype: *B. antiquata* Hall.

- Buthotrephis* Hall, Pal. New York, 1, 1847, p. 8.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 99.—Nathorst, Ofvers K. Vet.-Akad. Forhandl., 30, No. 9, 1873, p. 46.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.  
*Bythotrephis* Roemer, Leth. geog., 1, Theil, Leth. Pal., Erste Leif, 1880, p. 123.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 139.—Grabau, Bull. New York State Mus., 45, 1901, p. 130; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 130.—Miller, N. A. Geol. Pal., 1889, p. 109.



**Buthotrephis antiquata** Hall.

*Buthotrephis antiquata* Hall, Pal. New York, 1, 1847, p. 8, pl. 2, fig. 6.—Goeppert, Nov. Act. Acad. Caes. Leop. Car., 22, Suppl. (Uebergangsgeb.), 1852, p. 85.—Quenstedt, Handb. Petrefaktenk. Tübingen, 3d ed., 1885, p. 1081, fig. 402.—Lesley, Rep. Geol. Surv. Pennsylvania, P 4, 1889, p. 98, fig.  
Chazyan: Chazy, New York.

**Buthotrephis? caespitosa** Hall.

*Buthotrephis? caespitosa* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 178, pl. 1, fig. 1a-c (doc. ed., p. 170).  
Trenton: Near Watertown, New York.

**Buthotrephis clavelloides** (Grabau).

*Bythotrephis clavelloides* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 210, pl. 12, fig. 1.  
Cayugan (Akron): North Buffalo, New York.

**Buthotrephis divaricata** White.

*Buthotrephis divaricata* David White, Proc. U. S. Nat. Mus., 24, 1902, p. 265, pl. 16.  
Cayugan (Kokomo): Kokomo, Indiana.

BUTHOTREPHIS FILICIFORMIS James. See *Chloëphycus filiciformis*.

BUTHOTREPHIS GRACILIS Hall (1847). See *Buthotrephis tenuis*.

**Buthotrephis gracilis** (Hall).

*Fucoides gracilis* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 69, fig.  
*Buthotrephis gracilis* Hall (not Hall, 1847), Pal. New York, 2, 1852, p. 18, pl. 5, figs. 1a-d.—Rogers, Geol. Pennsylvania, 2, 1858, p. 822, fig. 625.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 137.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 574.—Lesquereux, 13th Ann. Rep. Indiana Geol. Surv., 1883, p. 30, pl. 1, figs. 1, 6, 7.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 160, pl. 9, fig. 6.—Lesley, Rep. Geol. Surv. Pennsylvania, P. 4, 1889, pp. 99, 100, figs.  
*Bythotrephis gracilis* Schimper, Pal. Veg., 1, 1869, p. 198.—Grabau, Bull. New York State Mus., 45, 1901, pp. 130, 131, fig. 25; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 130, 131, fig. 25.  
*Buthotrephis Hallii* Humphreys, Bull. Torrey Botanical Club, 37, 1910, p. 309.  
*Lithodendron dichotomum* Eaton, Geol. Textb., 2d ed., 1882, p. 39, pl. 4, fig. 43.—Clarke, 11th Rep. State Geol. New York, 1894, p. 34.—45th Rep. New York State Mus., 1894, p. 350.  
Clinton: New Hartford, New York. This species has been identified in the Silurian at numerous American localities.

**Buthotrephis gracilis crassa** Hall.

*Buthotrephis gracilis* var. *crassa* Hall, Pal. New York, 2, 1852, p. 19, pl. 5, fig. 3a-d; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 221, pl. 1, fig. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 101, fig.  
*Dendrograptus gracilis* var. *crassa* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.  
Silurian: Oneida County, etc., New York (Clinton); Waldron, Indiana (Waldron); Ontario (Cataract), etc.

**Buthotrephis gracilis intermedia** Hall.

*Buthotrephis gracilis* var. *intermedia* Hall, Pal. New York, 2, 1852, p. 19, pl. 5, fig. 2a, b.

**Buthotrephis gracilis intermedia**—Continued.

*Dendrograptus gracillimum* var. *intermedia* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 161.

Early Silurian: New Hartford, New York (Clinton); Ontario (Cataract), etc.

**BUTHOTREPHIS GRANTI** Dawson. See *Inocaulis grantii*.

**Buthotrephis gregaria** Ringueberg.

*Buthotrephis gregaria* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1888, p. 131, pl. 7, fig. 1.

Clinton (Rochester): Lockport, New York.

**BUTHOTREPHIS HALLII** Humphreys. See *Buthotrephis gracilis*.

**Buthotrephis impudica** Hall.

*Buthotrephis impudica* Hall, Pal. New York, 2, 1852, p. 20, pl. 6, fig. 2.

Clinton: New Hartford, New York.

**Buthotrephis lesquereuxi** Grote and Pitt.

*Buthotrephis Lesquereuxi* Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1876, p. 88.—Pohlman, *ibid.*, 4, 1881, p. 19, fig. 6.

*Bythotrephis lesquereuxi* Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 131, fig. 26; Bull. New York State Mus., 45, 1901, p. 131, fig. 26.

Cayugan (Akron): Buffalo, New York.

**Buthotrephis newlini** White.

*Buthotrephis newlini* David White, Proc. U. S. Nat. Mus., 24, 1902, p. 266, pls. 17, 18.

Cayugan (Kokomo): Kokomo, Indiana.

**Buthotrephis palmata** Hall.

*Buthotrephis palmata* Hall, Pal. New York, 2, 1852, p. 20, pl. 6, fig. 1; pl. 7, fig. 1a, b.

Clinton: New Hartford, New York.

**Buthotrephis pergracilis** Dawson.

*Buthotrephis pergracilis* Dawson, Canadian Rec. Sci., 3, 1888, p. 55.—Dawson. Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 54, fig. 27; 2d ser., 2, sec. 4, 1896, p. 120, fig. 32.

Canadian? (Levis?): Little Metis, Quebec.

**Buthotrephis ramosa** Hall.

*Buthotrephis ramosa* Hall, Pal. New York, 2, 1852, p. 21, pl. 6, fig. 3.

Clinton: New Hartford, New York.

**Buthotrephis ramulosa** Miller.

*Buthotrephis ramulosus* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 235, fig. 29.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.

*Bythotrephis ramulosus* Miller, N. A. Geol. Pal., 1889, p. 109, fig. 19.

Trenton (upper) or Eden (Fulton): Cincinnati, Ohio, and vicinity.

**Buthotrephis subnodosa** Hall.

*Buthotrephis subnodosa* Hall, Pal. New York, 1, 1847, p. 262, pl. 68, figs. 3a, b.—Göppert, Nov. Act. Acad. Caes. Leop. Car., 22, Suppl. (Uebergangsgeb.), 1852, p. 86.

Utica-Pulaski: Turin, Loraine, and Pulaski, New York.

**Buthotrephiss succulens Hall.**

*Buthotrephiss succulens* Hall, Pal. New York, 1, 1847, p. 62, pl. 22, figs. 2a, b.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 152, fig. 25.

*Buthotrephiss succulosa* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.

*Bythotrephiss succulens* Miller, N. A. Geol. Pal., 1889, p. 110.

*Licrophycus succulens* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 937 (gen. ref.).

Trenton: Glens Falls, New York.

*BUTHOTREPHISS SUCCULOSA* James. See *Buthotrephiss succulens*.

**Buthotrephiss tenuis (Hall).**

*Buthotrephiss gracilis* Hall, Pal. New York, 1, 1847, p. 62, pl. 21, fig. 1.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 7, fig. 1.—Etheridge, Quart. Jour. Geol. Soc. London, 39, 1878, p. 574.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 152, fig. 26b.

*Buthotrephiss* conf. *gracilis* Emerson, Narrative Hall's Second Arctic Exped., U. S. Navy Dep., 1879, p. 575, fig. 1.

*Buthotrephiss tenuis* Hall, Pal. New York, 2, 1852, p. 18.

*Bythotrephiss tenuis* Chapman, Proc. Royal Soc. Victoria, 15, new ser., 1903, p. 104, pl. 16, fig. 1.

Trenton: Jacksonburgh and Middleville, Herkimer County, New York.

**Buthotrephiss yukonensis Ami.**

*Bythotrephiss yukonensis* Ami., Canadian Geol. Surv., Summ. Rep. for 1904, 1905, p. 388.

Lower Paleozoic?: Seven miles north Dalton's Post, Unihana River, Yukon district, Canada.

**BYSSONYCHIA Ulrich.**

Genotype: *Ambonychia radiata* Hall.

*Ambonychia* (part) Hall, Pal. New York, 1, 1847, p. 163; 3, 1859, pp. 269 and 523; also of many American and European authors.

*Byssonychia*, Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 498; Geol. Surv. Ohio, 7, 1893, p. 629.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 979.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431.—Dall. Zittel-Eastman Textb. Pal., 1900, p. 368; 2d. ed., 1913, p. 445.

**Byssonychia acutirostris Ulrich.**

*Byssonychia acutirostris* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 634, pl. 45, figs. 8, 9; pl. 46, fig. 10.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 46095 U.S.N.M.

**Byssonychia alveolata Ulrich.**

*Byssonychia alveolata*, Ulrich, Geol. Surv. Ohio, 7, 1893, p. 631, pl. 48, figs. 1-3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 989, pl. 42, figs. 7, 7a.

Maysville (Corryville): Cincinnati, Ohio; southeastern Indiana.

*Holotype*.—Cat. No. 46096, U.S.N.M.

**Byssonychia(?) byrnesi Ulrich.**

*Byssonychia(?) byrnesi* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 635, pl. 47, figs. 4 and 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431, fig. 563.—

Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 134, pl. 3, fig. 6.

Trenton (Upper): Covington, Rogers Gap, etc., Kentucky; Tennessee.

*Cotypes*.—Cat. No. 46097, U.S.N.M.



**Byssonychia carinata** (Goldfuss).

*Pterinea carinata* Goldfuss, Petref. Germ., 1826, p. 136, pl. 119, fig. 8.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 64, p. 65, fig. 1.—Emmons, *ibid.*, Geol., 2, 1842, p. 402, fig. 1.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 376, fig. 1.

*Avicula carinata* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 175, pl. 17, fig. 23.  
*Ambonychia carinata* Hall, Pal. New York, 1, 1847, p. 294, pl. 80, figs. 5a, b; Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 215, pl. 31, fig. 3; Pal. New York, 3, 1861, p. 269.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 22, fig.

*Byssonychia carinata* Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 324.

Cincinnatian (Pulaski): Lewistown, Oneida County, New York.

**Byssonychia cultrata** Ulrich.

*Byssonychia cultrata*, Ulrich, Geol. Surv. Ohio, 7, 1893, p. 632, pl. 45, figs. 5-7. Richmond (Waynesville): Waynesville, Ohio; Versailles, Indiana.

*Cotypes*.—Cat. Nos. 46098, 46596, U.S.N.M.

**Byssonychia grandis** Ulrich.

*Byssonychia grandis* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 631, pl. 46, figs. 6-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 990, pl. 44, figs. 1, 1a.

Richmond (Waynesville-Whitewater): Oxford, Clarksville, etc., Ohio; Indiana.

*Cotypes*.—Cat. Nos. 46099, 46100, U.S.N.M.

**Byssonychia imbricata** Ulrich.

*Byssonychia imbricata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 635, pl. 46, figs. 4 and 5.

Maysville (Corryville): Cincinnati, Ohio.

*Holotype*.—Cat. No. 46101, U.S.N.M.

**Byssonychia intermedia** (Meek and Worthen).

*Ambonychia intermedia* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 306, pl. 2, fig. 5a, b.

*Byssonychia intermedia* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 499, pl. 35, figs. 23-26.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 182.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431, fig. 562a, b.

Trenton: Mount Carroll, Illinois; Oshkosh, Wisconsin; Wykoff, Minnesota; Lake Winnepeg, Canada; Kentucky.

*Plesiotype*.—Cat. No. 46102, U.S.N.M.

**Byssonychia obesa** Ulrich.

*Byssonychia obesa* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 630, pl. 45, figs. 10-12.—Whiteaves, Pal. Foss., 2, Geol. Surv. Canada, 3, 1895, pt. 2, p. 122 (loc. occ.).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 991, pl. 42, figs. 8, 8b.

*Ambonychia obesa* Miller, N. A. Geol. Pal., 1897, 2d App., p. 779 (gen. ref.).

Richmond: Richmond, Indiana (Whitewater); Stony Mountain, Manitoba.

*Holotype*.—Cat. No. 46103, U.S.N.M.

**Byssonychia præcursa** Ulrich.

*Byssonychia præcursa* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 633, pl. 45, figs. 1, 2.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 992, pl. 43, figs. 3, 3a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 432, fig. 565.

Maysville: Lorraine, New York (Pulaski); Covington, Kentucky, and vicinity (Fairmount).

*Cotype*.—Cat. No. 46104, U.S.N.M.

**Byssonychia radiata** (Hall).

*Ambonychia radiata* Hall, Pat. New York, 1, 1847, p. 292, pl. 80, figs. 4a-l.—Billings, Canadian Nar. Geol., 1, 1856, p. 44, fig. 7.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 8, fig.; p. 110, figs. 1, 2.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 4, fig. 7.—Hall, Pal. New York, 3, 1861, p. 269, fig.; p. 523, figs. 1, 2.—Chapman, Canadian Jour. n. s., 7, 1862, p. 166, fig. 110; *ibid.*, 8, 1863, p. 206, fig. 205.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 54, figs. 1, 2.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 215, fig. 219.—Chapman, Expos. Min. Geol. Canada, 1864, p. 120, fig. 110; p. 178, fig. 205.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 14, 15.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 35, fig. 11.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 79, pl. 2, fig. 2.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 4, fig. 17.—Zittel, Handb. Pal., 2, 1881, p. 35, fig. 42b.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 174, fig.—Miller, N. A. Geol. Pal., 1889, p. 461, fig. 771.—Lesley, Geol. Pennsylvania, Rep. P 4, 1889, p. 23, figs.

*Byssonychia radiata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 477, fig. 35VI.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 993, pl. 43, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 432, fig. 562c, 566.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 14, fig. 7.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 273, pl. 3, figs. 12a-c.

Maysville-Richmond: Turin, Lorraine, Pulaski, etc., New York, and Quebec (Pulaski); Ohio; Indiana; Kentucky; Virginia; Tennessee (Maysville and Richmond); Anticosti, etc., Canada.

*Plesiotype*.—Cat. No. 46105, U.S.N.M. (Ulrich).

**Byssonychia retrorsa** (Miller).

*Ambonychia retrorsa* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 104, fig. 3, fig. 6.

*Byssonychia retrorsa* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 499 (gen. ref.). Maysville (Fairmount): Cincinnati, Ohio.

**Byssonychia richmondensis** Ulrich.

*Ambonychia robusta* Miller (part), Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 315.

*Byssonychia richmondensis* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 632, pl. 45, figs. 3, 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 994, pl. 44, figs. 2-2a.

Richmond (Whitewater): Richmond, etc., Indiana.

*Holotype*.—Cat. No. 46106, U.S.N.M.

**Byssonychia robusta** (Miller).

*Ambonychia robusta* Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1881, p. 315, pl. 8, figs. 3, 3a.

*Byssonychia robusta* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 499 (gen. ref.). Richmond (Whitewater): Osgood, Indiana.

**Byssonychia suberecta** Ulrich.

*Byssonychia suberecta* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 634, pl. 45, figs. 13-15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 995, pl. 44, figs. 3-3b.

Richmond (Waynesville): Waynesville, Ohio; Versailles, Indiana.

*Cotypes*.—Cat. No. 46107, U.S.N.M.

**Byssonychia tenuistriata** Ulrich.

*Byssonychia tenuistriata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 500, fig. 39.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 996, pl. 43, figs. 5, 5a.



**Byssonychia tenuistriata**—Continued.

Ambonychia tenuistriata Miller, N. A. Geol. Pal., 2d App., 1897, p. 779 (gen. ref.).  
 Richmond: Granger and Spring Valley, Minnesota (Maquoketa); Richmond,  
 Indiana (Whitewater).

**Byssonychia vera** Ulrich.

Byssonychia vera Ulrich, Geol. Surv. Ohio, 7, 1893, p. 629, figs. a-c.—Foerste,  
 Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 134, pl. 1, fig. 15.

Ambonychia bellistriata, Miller (not Hall, 1847), Cincinnati Quart. Jour. Sci., 1,  
 1874, p. 14.

Byssonychia radiata (Hall) new var., Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p.  
 479, fig. 36V.

Ambonychia cincinnatiensis Miller and Faber, Jour. Cincinnati Soc. Nat. Hist.,  
 17, 1894, p. 24, pl. 1, figs. 8-10.

Eden: Cincinnati, Ohio, and vicinity.

Trenton (Upper): Rogers Gap, etc., Kentucky.

Cotypes.—Cat. No. 46108, U.S.N.M.

**Byssonychia walkerensis** Grabau.

Byssonychia walkerensis Grabau, Bull. Geol. Soc. Amer., 24, 1913, p. 454.

Maysville (Bays): Big Walker Mountain, Virginia.

**BYTHOCLADUS** Whitfield. See *Buthograptus* Hall.

**BYTHOCYPRIS** Brady.

Genotype: *B. reniformis* Brady.

Bythocypris Brady, "Challenger" Exped. Rept. Ostracoda, 1880, p. 45.—Jones  
 and Kirkby, Ann. Mag. Nat. Hist., 5th ser., 18, 1886, p. 250; Proc. Geol. Assoc.,  
 9, 1897, p. 510.—Jones, Ann. Mag. Nat. Hist., 5th. ser., 19, 1887, p. 184.—  
 Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 196.—Miller, N. A.  
 Geol. Pal., 1st App., 1892, p. 706.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894,  
 p. 686; Zittel-Eastman Textb. Pal., 1, 1900, p. 646.—Grabau and Shimer,  
 N. A. Index Fossils, 2, 1910, p. 365.—Bassler, Zittel-Eastman Textb. Pal.,  
 2d ed., 1913, p. 740.

**Bythocypris(?) curta** Ulrich.

Bythocypris (?) curta Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 689, pl. 44, figs.  
 36-38.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 41794, U.S.N.M.

**Bythocypris cylindrica** (Hall).

Leperditia (Isochilina) cylindrica Hall, 24th Rep. New York State Cab. Nat.  
 Hist., 1872, p. 231, pl. 8, fig. 12 (Extract, 1871, p. 7, pl. 4, fig. 12).—Hall and  
 Whitfield, Geol. Surv. Ohio, Pal. 2, 1875, p. 101, pl. 4, fig. 5.

Leperditia cylindrica Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 122; 2,  
 1875, p. 351.

Bythocypris cylindrica Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 687, pl. 44,  
 figs. 29-35, p. 688.—Ulrich, Geol. Surv. Canada, Cont. Micro-Pal., pt. 2,  
 1889, p. 48, pl. 9, fig. 6.—Ruedemann, Bull. New York State Mus., 49, 1901,  
 p. 86, pl. 7, figs. 26, 28.

Bythocypris (Cytherellina?) cylindrica Grabau and Shimer, N. A. Index Fos-  
 sils, 2, 1910, p. 365, fig. 1666.

Primitia minuta Jones (part), Quart. Jour. Geol. Soc. London, 46, 1890, p. 7, pl.  
 3, figs. 18, 19 (not figs. 21-23).

Trenton to Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky;  
 Tennessee; Minnesota; New York; Ontario, Manitoba; etc.

Plesiotypes.—Cat. Nos. 41795, 41796, U.S.N.M.



**Bythocypris granti** Ulrich.

*Bythocypris granti* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 689, pl. 44, figs. 39-42.

Black River (Decorah): St. Paul and Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 41793, U.S.N.M.

**Bythocypris? lindströemi** Jones.

*Bythocypris? lindströemi* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 548, pl. 21, figs. 11a-c.

Richmond (English Head and Charleton): South of Junction Cliff, Anticosti.

**Bythocypris nearpassi** Weller.

*Bythocypris nearpassi* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 257, pl. 23, fig. 12.

Helderbergian (Decker Ferry): Two miles south Tri-States, New York.

**Bythocypris? obtusa** Jones.

*Bythocypris? obtusa* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 549, pl. 21, figs. 4a, b.

Richmond (English Head and Charleton): English Head, etc., Anticosti.

**Bythocypris punctulata aretata** Ulrich and Bassler.

*Bythocypris punctulata* var. *aretata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 540, pl. 98, fig. 22.

Helderbergian (Keyser): Cumberland, Maryland; Keyser, West Virginia.

*Holotype*.—Cat. No. 53290 U.S.N.M.

**Bythocypris punctulata niagarensis** Ulrich.

*Bythocypris punctulata niagarensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 196.

Clinton (Rochester): Lockport, New York.

*Holotype*.—Cat. No. 41797, U.S.N.M.

**Bythocypris(?) robusta** Ulrich.

*Bythocypris(?) robusta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 690, figs. 52a-d.

*Bythocypris(?) (Cytherellina?) robusta* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 365, fig. 1667, 1, 1', m, n.

Black River (Platteville): Dixon, Illinois.

*Holotype*.—Cat. No. 41728, U.S.N.M.

**BYTHOPORA** Miller and Dyer.

Genotype: *B. fruticosa* Miller and Dyer=*Helopora dendrina* James.

*Bythopora* Miller and Dyer, Contr. Pal., No. 2, 1878, p. 6.—Miller, N. A. Geol. Pal., 1889, p. 295.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 376; Geol. Minnesota, 3, 1893, p. 263; Zittel's Textb. Pal. (Eng. ed.), 1896, p. 277.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 551.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 32.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 166; Bull. New York State Mus., 45, 1901, p. 166.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 29.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 741.—Hennig, Archiv für Zool., 4, No. 10, 1908, p. 44.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 240; Zittel-Eastman Textb. Pal., 1913, p. 335.

**Bythopora alcornis** Ulrich.

*Bythopora alcornis* Ulrich, Geol. Minnesota, 3, 1893, p. 264, pl. 26, figs. 7-9.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 551, fig. 121.

Black River (Decorah): Near Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 43514, U.S.N.M.

**Bythopora arctipora** (Nicholson).

*Ptilodietya?* *arctipora* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 15, 1875, p. 180, pl. 14, figs. 4-4b; Pal. Ohio, 2, 1875, p. 262, pl. 25, figs. 9-9b.—Lesley, Geol. Surv. Pennsylvania, Rep. P. 4, 1889, p. 825, figs.

*Bythopora arctipora* Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 6.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 19, pl. 2, figs. 1, 2.—Cumings, 32d Ann.

Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 780, pl. 8, fig. 8; pl. 26, fig. 15, 15a.

*Chætetes minutus* James, Paleontologist, 3, 1879, p. 20 (see James and James, Jour. Cincinnati Soc. Nat. Hist., 10, p. 173).

Eden: Cincinnati, Ohio, and vicinity.

**Bythopora delicatula** (Nicholson).

*Chætetes delicatulus* Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 505, pl. 29, figs. 8-8b; Pal. Ohio, 2, 1875, p. 199, pl. 21, figs. 9, 9a; Pal. Province Ontario, 1875, p. 30.

*Monticulipora delicatula* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 173.—Miller, N. A. Geol. Pal., 1889, p. 197, fig. 196.

*Bythopora?* *delicatula* Ulrich, Contr. Micro-Pal., Cambro-Sil., pt. 2, 1889, p. 36.—Whiteaves, Pal. Foss., 3, 1895, p. 116.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 184.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 781, pl. 8, fig. 7; pl. 27, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133.

Richmond: Oxford, Waynesville, etc., Ohio; Richmond and other localities in Indiana; Weston and Toronto, Ontario; Stony Mountain, Manitoba.

**Bythopora dendrina** (James).

*Helopora dendrina* James, Paleontologist, No. 1, 1878, p. 3; No. 2, p. 14.

*Bythopora dendrina* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 185.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 20.

*Bythopora fruticosa* Miller and Dyer, Contr. Pal., No. 2, 1878, p. 6, pl. 4, figs. 6, 6a.—Miller, N. A. Geol. Pal., 1889, p. 295, fig. 461.

Maysville (Fairmount) Cincinnati, Ohio, and vicinity.

*BYTHOPORA FRUTICOSA* Miller and Dyer. See *Bythopora dendrina*.

**Bythopora gracilis** (Nicholson).

*Chætetes gracilis* James, Cat. Low. Sil. Foss. Cincinnati Group, 1871, p. 3.—Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 504, pl. 29, figs. 7, 7a; Pal. Ohio, 2, 1875, p. 198, pl. 21, figs. 8, 8b; Pal. Province Ontario, 1875, p. 11; Ann. Mag. Nat. Hist., 4th ser., 28, 1876, p. 90, pl. 5, fig. 13.

*Monticulipora* (*Heterotrypa*) *gracilis* Nicholson, Genus *Monticulipora*, 1881, p. 125, pl. 2, figs. 1-1b, 20.

*Monticulipora gracilis* Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 248, pl. 10, figs. 1-3; pl. 11, fig. 11.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 173.—Lesley, Geol. Surv. Pennsylvania, Rep. P. 4, 1889, p. 420, figs.—James, Jour. Cincinnati Soc. Nat. Hist., 1894, 16, p. 191.

*Batostomella gracilis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 141; 6, 1883, p. 83; 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 103; Contr. Micro-Pal., Cambro-Sil., pt. 2, 1889, p. 35.—Miller, N. A. Geol. Pal., 1889, p. 294, fig. 458.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 432, pl. 35, fig. 2.

*Homotrypella gracilis* Ulrich, Geol. Minnesota, 3, 1893, p. 228.—Whiteaves, Pal. Foss., 3, 1895, p. 115.

*Bythopora gracilis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 185.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 20.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 782, pl. 8, figs. 6, 6b; pl. 27, figs. 2, 2a.



**Bythopora gracilis**—Continued.

*Chaetetes laeviramus* Quenstedt, Röhren- und Sternkorallen, 1881, p. 81, pl. 146, fig. 2b.

Maysville: Cincinnati, Ohio, and vicinity; Kentucky; Indiana; Tennessee.

*Plesiotypes*.—Cat. No. 43408, U.S.N.M. (Ulrich).

**Bythopora herricki** (Ulrich).

*Bythopora herricki* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 99; Geol. Minnesota, 3, 1893, p. 263, pl. 26, figs. 1-6.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 551, fig. 120.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133, fig. 188e, 190e.

Black River (Decorah): St. Paul, Minnesota, and vicinity.

*Cotypes*.—Cat. No. 43513, U. S. N. M.

**Bythopora meeki** (James).

*Chaetetes meeki* James, Paleontologist, No. 1, 1878, p. 1.

*Monticulipora* (*Chaetetes*) *meeki* James, Paleontologist, No. 5, 1881, p. 35.

*Monticulipora gracilis* var. *meeki* Nicholson, Genus *Monticulipora*, 1881, p. 127.

*Monticulipora meeki* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 174.—J. F. James, *ibid.*, 16, 1894, p. 192.

*Homotrypella meeki* Ulrich, Geol. Minnesota, 3, 1893, p. 228.

*Bythopora meeki* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 185.—

Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 21.—Cumings, 32d Ann. Rep. Dep.

Geol. Nat. Res. Indiana, 1908, p. 783, pl. 8, figs. 5, 5a; pl. 27, fig. 5.

Richmond: Waynesville and other localities in Ohio, Richmond, etc., Indiana; Kentucky.

**BYTHOPORA NASHVILLENSIS** Miller. See *Rhinidictya nashvillensis*.

**Bythopora parvula** (James).

*Helopora parvula* James, Paleontologist, No. 1, 1878, p. 3.

*Bythopora parvula* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 186.—

Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 22, pl. 3, figs. 11, 12; pl. 5, fig. 4.—

Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 783, pl. 27, fig. 3.

Eden (McMicken): Obanon Creek, Clermont County, Cincinnati, etc., Ohio; Indiana; Kentucky.

**Bythopora spinulosa** (Hall).

*Trematopora spinulosa* Hall, Pal. New York, 2, 1852, p. 155, pl. 40A, figs. 11a-c.

*Bythopora spinulosa* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p.

180.—Grabau, Bull. New York State Mus., 45, 1901, p. 166, fig. 64; Bull.

Buffalo Soc. Nat. Sci., 7, 1901, p. 166, fig. 64.—Bassler, Bull. U. S. Geol.

Surv., 292, 1906, p. 29, pl. 13, figs. 6, 7; pl. 24, figs. 12, 13.—Grabau and

Shimer, N. A. Index Fossils, 1, 1907, p. 134, fig. 189.

Clinton (Rochester): Lockport, Rochester, etc., New York; Thorold, Hamilton, and Grimsby, Ontario.

*Plesiotypes*.—Cat. No. 35516, U.S.N.M.

**Bythopora striata** Ulrich.

*Bythopora striata* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 36.—

Whiteaves, Pal. Foss., 3, 1895, p. 116.—Cumings, 32d Ann. Rep. Dep. Geol.

Nat. Res. Indiana, 1908, p. 784, pl. 27, fig. 4.

Richmond: Stony Mountain, Manitoba (Stony Mountain); Anticosti (English Head); Ohio; Indiana; Kentucky (Arnheim and Waynesville).

*Cotypes*.—Cat. No. 44064, U.S.N.M.



**Bythopora subgracilis** (Ulrich).

Homotrypella? subgracilis Ulrich, Geol. Minnesota, 3, 1893, p. 230, pl. 26, figs. 10-16.

Bythopora subgracilis Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 241, 242, figs. 135, 136.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Wassaleim): Uxnorn, Esthonia, Russia.

Cotypes and plesiotypes.—Cat. Nos. 43558, 57314, U.S.N.M.

**BYTHOTREPHIS** Roemer. See Buthotrephis Hall.

**BYTHOTRYPA** Ulrich. See Favositella Etheridge and Foord.

**CACTOGRAPTUS** Ruedemann.

Genotype: *C. crassus* Ruedemann.

Cactograptus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 196.

**Cactograptus crassus** Ruedemann.

Cactograptus crassus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 197, pl. 8, fig. 1, figs. 99-101.

Upper Clinton: Clinton, Oneida County, New York.

**CALAMENA** Eaton. See Calymene Brongniart.

**CALAMOPORA** Goldfuss. See Favosites Lamarck.

**Calamopora cellulata** Castelnau.

Not recognized.

Calamopora cellulata Castelnau, Syst. Sil. l'Amer. Nord., 1843, p. 46.

Silurian: Point Latour, Lake Huron.

**CALAMOPORA FAVOSA** Goldfuss. See Favosites favosus.

**CALAMOPORA FIBROSA** Eichwald. See Dianulites petropolitana.

**CALAMOPORA FIBROSA** Roemer. See Hindia sphaeroidalis.

**CALAMOPORA FORBESI** var. **DISCOIDEA** Roemer. See Favosites discoidea.

**CALAMOPORA GOLDFUSSI** Castelnau. See Favosites goldfussi.

**CALAMOPORA GOTHLANDICA** Goldfuss. See Favosites gothlandica.

**CALAMOPORA MAXIMUS** Troost. See Favosites maxima.

**Calamopora minuta** Castelnau.

Not recognized.

Calamopora minuta Castelnau, Terr. Sil. de l'Amer. du Nord, 1846, p. 46.

Silurian: Drummond Island, Lake Huron, etc.

**Calamopora minutissima** Castelnau.

Not recognized.

Calamopora minutissima Castelnau, Terr.-Sil. de l'Amer. du Nord, 1843, p. 46, pl. 18, fig.

Silurian: Drummond Island, Lake Huron.

**Calamopora radians** Castelnau.

Calamopora radians Castelnau, Terr.-Sil. de l'Amer. Nord, 1843, p. 46, pl. 18, fig. 1.

Silurian: Buffalo, New York.

Observation.—Not recognized. Figure represents basal side of some Favosites, probably a Devonian species.

**CALAMOPORA VENUSTA** Rominger. See Favosites hisingeri.

**Calamopora verneuili** Castelnau.

Calamopora Verneuili Castelnau, Sil. Syst., 1843, p. 47.

Ordovician: Near Quebec, Canada.

Observation.—Not recognized. Refers to some ramose trepostomatous bryozoan with monticules.

**CALAPŒCIA** Billings.Genotype: *C. canadensis* Billings.

- Calapœcia* Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 425.—Nicholson, Tab. Corals Pal. Period, 1879, p. 162.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 433.—Miller, N. A. Geol. Pal., 1889, p. 174.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 150.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 295.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 24.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 42.—Etheridge, Rec. Australian Mus., 5, 1903, p. 18.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 699.
- Columnopora* Nicholson, Geol. Mag., dec. 2, 1, 1874, p. 253; Geol. Surv. Ohio, Pal., 2, 1875, p. 186; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 25; Tab. Corals Pal. Period, 1879, p. 159.—Zittel, Handb. Pal., 1, Munich, 1879, p. 237.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 433.—Beecher, Trans. Connecticut Acad. Arts and Sci., 8, 1891, p. 212.—Lindström, Kongl. Sven. Vet.-Acad. Handl., 32, No. 1, 1899, p. 25. (Genotype: *C. cribriformis* Nicholson.)
- Houghtonia* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 18.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 433.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 276.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 25. (Genotype: *H. huronica* Rominger.)

**Calapœcia anticostiensis** Billings.

- Calapœcia* Anticostiensis Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 426; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 32, figs. 15a, b.—Nicholson, Tab. Corals Pal. Period, 1879, p. 163.
- Calapœcia* Canadensis Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 426.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1889, p. 43, pl. 1, figs. 6, 6a, 7.—Nicholson, Tab. Corals Pal. Period, 1879, p. 163.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 2, pt. 3, 1897, p. 157.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 154.
- Richmond and Gamachian (English Head—Ellis Bay): Gamache Bay, etc., Anticosti (*C. anticostiensis*).
- Black River: Near Ottawa, Canada; Baffin Land, etc. (*A. canadensis*).

Observation.—Although considered the same species at present, *C. canadensis* may be an early variety of *C. anticostiensis*. It is also possible that the types of *C. canadensis* were derived from the Richmond and not from the Black River.

**Calapœcia borealis** Whitfield.

- Calapœcia* borealis Whitfield, Bull. Amer. Mus. Nat. Hist., 13, 1900, p. 20, pl. 2, figs. 3-7.
- Niagaran: Cape Harrison, Princess Marie Bay, Greenland.

**CALAPŒCIA CANADENSIS** Billings (part). See *Calapœcia anticostiensis*.

**Calapœcia cribriformis** (Nicholson).

- Columnopora* cribriformis Nicholson, Geol. Mag., dec. 2, 1, 1874, p. 253; Geol. Surv. Ohio, Pal., 2, 1875, p. 187, pl. 22, figs. 8, 8b; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 25; Tab. Corals Pal. Period, 1879, p. 164, pl. 7, figs. 2-2d.—Whiteaves, Rep. Progr., Geol. Surv. Canada, 1880, p. 48C; 1881, p. 570.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 434, fig. 103.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 5, figs. 2, 4, 5; pl. 6, fig. 2.
- Calapœcia* cribriformis Miller, N. A. Geol. Pal., 1889, p. 175, fig. 141.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 150.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 295, text figs. 23, 24.—Foerste, Amer. Geology, 31, 1903, pp. 343, 345.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 701, pl. 1, figs. 3-3b; pl. 5, fig. 1.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 310, pl. 11, fig. 4.



**Calapœcia cribriformis**—Continued.

Houghtonia huronica Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 18, pl. 3, figs. 3, 4.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 276, 277, text fig. 13, 14.

Calapœcia Huronensis Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 426.—Nicholson, Tab. Corals Pal. Period, 1879, p. 163.

Columnopora rayi Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 5, figs. 1, 3; pl. 6, fig. 1.

Richmond: Waynesville, Clarksville, Oxford, Ohio; Richmond, Indiana; Marion and other counties in Kentucky (Waynesville-Elkhorn); Anticosti (Charleton); Ontario, Drummond Isle, etc.

**Calapœcia favositoidea** Savage.

Calapœcia favositoidea Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 64, pl. 3, figs. 1-3.

Upper Medinan (Edgewood): Near Edgewood and Louisiana, and south of Clarksville, Pike County, Missouri.

CALAPŒCIA HURONENSIS Billings. See Calapœcia cribriformis.

**CALATHIUM** Billings.

Genotype: *C. formosum* Billings.

Calathium Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 208, 209.—Hinde, Quart. Jour. Geol. Soc. London, 45, 1889, p. 144.—Miller, N. A. Geol. Pal., 1889, p. 155.

**Calathium affine** Billings.

Calathium affine Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 209, fig. 193. Canadian (Quebec—G): Cape Norman, Newfoundland.

**Calathium anstedii** Billings.

Calathium Anstedii Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 210, fig. 194; p. 337, figs. 325a, b.—Hinde, Quart. Jour. Geol. Soc. London, 45, 1889, p. 144.

Canadian (Quebec—H): Pistolet Bay, Newfoundland.

**Calathium canadense** Billings.

Calathium Canadense Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 377, text fig. 351.—Miller, N. A. Geol. Pal., 1889, p. 155, text fig. 93.

Chazyan (Mingan): Mingan Islands, Canada.

**Calathium fittoni** Billings.

Calathium Fittoni Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 211, fig. 195.

Chazyan (Quebec): Point Rich, Newfoundland.

**Calathium formosum** Billings.

Calathium formosum Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 209, fig. 192.—Miller, N. A. Geol. Pal., 1889, p. 155, fig. 94.

Canadian (Quebec—G): Cape Norman, Newfoundland.

**Calathium (?Zittellella) infelix** Ulrich and Everett.

Calathium (?Zittellella) infelix Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 274, pl. 5, figs. 1, 1a.

Black River (Platteville): Near Dixon, Illinois.

**Calathium? pannosum** Billings.

Calathium? pannosum Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 335, figs. 324a, b.

Ozarkian? (Levis-erratic): Point Levis, Quebec.



*CALATHIUM?* *PARADOXICUM* Billings. See *Nipterella paradoxica*.

*CALAUROPS* Whitfield. See *Eccyliomphalus* Portlock.

*Calceocrinus* of authors. See *Deltacrinus*, *Eucheirocrinus*, and *Cremacrinus*.

*Calceocrinus* Hall.

Not recognized.

*Calceocrinus* Hall, Pal. New York, 2, 1852, p. 352, pl. 85, figs. 5, 6.—Ulrich, 14th Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 104.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 154.

Observation.—This genus was based upon a small triangular plate without a specific name and according to the rules of nomenclature can not be retained.

*CALCEOCRINUS ALLENI* Rowley. See *Deltacrinus allenii*.

*CALCEOCRINUS ARTICULOSUS* Wachsmuth and Springer. See *Cremacrinus articulatus*.

*CALCEOCRINUS BARRANDEI* Walcott. See *Cremacrinus barrandei*.

*Calceocrinus bidentatus* Ringueberg.

*Calceocrinus bidentatus* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 404, pl. 10, fig. 10.

Clinton (Rochester): Lockport, New York.

Observation.—Description and figure insufficient for recognition.

*CALCEOCRINUS CHRYSALIS* Shumard. See *Eucheirocrinus chrysalis*.

*CALCEOCRINUS CONTRACTUS* Ringueberg. See *Deltacrinus contractus*.

*CALCEOCRINUS FURCILLATUS* Billings. See *Cremacrinus furcillatus*.

*CALCEOCRINUS HALLI* Ringueberg. See *Deltacrinus halli*.

*CALCEOCRINUS INÆQUALIS* Wachsmuth and Springer. See *Cremacrinus inæqualis*.

*CALCEOCRINUS INDIANENSIS* Miller. See *Deltacrinus indianensis*.

*CALCEOCRINUS KENTUCKIENSIS* Miller and Gurley. See *Cremacrinus articulatus*.

*CALCEOCRINUS RADICULUS* Ringueberg. See *Eucheirocrinus radiculatus*.

*CALCEOCRINUS RUGOSUS* Billings. See *Cremacrinus rugosus*.

*CALCEOCRINUS STIGMATUS* Hall. See *Deltacrinus stigmatus*.

*CALCEOCRINUS TUNICATUS* Hall. See *Deltacrinus tunicatus*.

*CALCEOCRINUS TYPUS* Ringueberg. See *Deltacrinus typus*.

**CALCEOLA** Lamarck.

Genotype: *C. sandalina* Lamarck.

*Calceola* Lamarck, Syst. Anim. sans Vert., 1801, p. 139.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 289.—Steininger, Mem. Soc. Geol. France, 1, 1834, p. 366.—Fischer de Waldheim, Oryctographie Gouv. de Moscou, 1837, p. 146.—Phillips, Pal. Foss. Cornwall, Devon, and W. Somerset, 1841, p. 54.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, pp. 103, 105.—Murchison, Verneuil, Keyserling, Geol. Russie d'Europe et Mont d l'Oural, 2, 845, p. 45.—Davidson, Brit. Foss. Brachiopoda, Pal. Soc., 1853, p. 120.—Carpenter, ibid., p. 37.—Woodward, Man. Mollusca, pt. 2, 1854, p. 232, fig. 152; pl. 15, fig. 26.—Davidson, Mem. Soc. Linneenne de Normandie, 10, 1856, p. 224.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 65.—Goldfuss, Petrefacta Germaniae, 2d ed., pt. 2, 1863, p. 273.—Lindstrom, Geol. Mag., 3, 1866, pp. 359, 408, 411.—Dybowski, Archiv. f. Natur. Liv-, Ebst-und Kurl., 5, 1873, p.

**CALCEOLA**—Continued.

340.—Zittel, Handb. Pal., 1, 1879, p. 236.—Lindstrom, Bihang till K. Sv. Vet.-Akad. Handl., 7, No. 4, 1882, p. 10.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 405.—Miller, N. A. Geol. Pal., 1889, p. 175.—Sherzer, Amer. Geol., 7, 1891, pp. 296–301.—Koken, Die Leitfossilien, Leipzig, 1896, p. 312, fig. 235.—Zittel-Eastman Textb. Pal., 1, 1900, p. 80.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 77.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 88.

*Rhizophyllum* Lindström, Ofver. K. Vet.-Akad. Forhandl., 22, No. 5, 1865, p. 287; Geol. Mag., 3, 1866, pp. 359, 411.—Dybowsky, Archiv f. Natur. Liv-, Ehst- und Kurl., 5, 1873, p. 340.—Zittel, Handbuch d. Pal., 1, Munich, 1879, p. 235.—Lindstrom, Bihang till K. Sv. Vet.-Akad. Handl., 7, No. 4, 1882, p. 22.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 407.—Sherzer, Amer. Geologist, 7, 1891, pp. 296–301.—Koken, Die Leitfossilien, 1896, p. 313.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 179. (Genotype: *Calceola gotlandica* Roemer.)

*CALCEOLA AMERICANA* Safford. See *Calceola tennesseensis*.

**Calceola (Rhizophyllum) attenuata** (Lyon).

*Calceola attenuatus* Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 45.

*Rhizophyllum attenuatum* Lindström, Bihang till K. Sv. Vet.-Akad. Handl., 7, No. 4, 1882, p. 38, pl. 3, fig. 17.

*Calceola proteus* Davis (part), Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, pl. 131, figs. 1, 2, 12.

Niagaran (Louisville): Near Louisville, Kentucky.

*Plesiotype*.—Cat. No. 52774, U.S.N.M.

**Calceola (Rhizophyllum) corniculum** (Lyon).

*Calceola corniculum* Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 43.

*Calceola coxii* Lyon, *ibid.*, 1879, p. 44.

*Calceola pusilla* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 419 (ext. 1882, p. 15).

*Calceola proteus* Davis (part), Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 101, fig. 2, pl. 131, figs. 3–11, 13–17.

Niagaran (Louisville): Near Louisville, Kentucky.

*Plesiotypes*.—Cat. No. 52774, U.S.N.M.

*CALCEOLA COXII* Lyon. See *Calceola (Rhizophyllum) corniculum*.

*CALCEOLA PROTEUS* Davis. See *Calceola (Rhizophyllum) attenuatus* and *Calceola (Rhizophyllum) corniculum*.

*CALCEOLA PUSILLA* Hall. See *Calceola (Rhizophyllum) corniculum*.

*CALCEOLA SANDALINA* Troost. See *Calceola tennesseensis*.

**Calceola (Rhizophyllum) tennesseensis** Roemer.

*Calceola sandalina* Troost (not Lamarck), Trans. Geol. Soc. Pennsylvania, 1, 1835, p. 249; 5th Geol. Rep. Tennessee, 1840, p. 47.—Verneuil, Bull. Geol. Soc. France, 1840, p. 176.

*Calceola tennesseensis* Roemer, Leth. Geogn., 3d ed., Th. 2, 1854, p. 385; Sil. Fauna West Tennessee, 1860, p. 73, pl. 5, figs. 1a–e.—Lindström, Geol. Mag., 3, 1866, p. 411.—Safford, Geol. Tennessee, 1869, p. 321, pl. 5 (H), figs. 4a–e.—Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 43, footnote.—Foerste, Jour. Geol., 11, 1903, p. 712 (loc. occ.).—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 77, fig. 121.

**Calceola (Rhizophyllum) tennesseensis**—Continued.

*Calceola Americana* Safford, Amer. Jour. Sci. and Arts, 2d ser., 29, 1860, p. 248.

*Rhizophyllum tennesseense* Lindström, Bihang till k. Sv. Vet.-Akad., 7, No. 4, 1882, p. 30, pl. 3, fig. 14; pl. 9, figs. 3-5.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 408.

Niagaran (Brownsport): Decatur, Perry, Wayne, and Hardin Counties, Tennessee.

**CALLICRINITES** D'Orbigny. See *Callicrinus* D'Orbigny.

**CALLICRINUS** D'Orbigny.

Genotype: *C. costatus* Hisinger.

*Callicrinites* D'Orbigny, Prodr. Pal. Strat., 1, 1849, p. 45; Cour. Element. Pal.

Geol., 2, 1851, p. 141.—Chapman, Canadian Jour., n. s., 2, 1857, p. 304.

*Callicrinus* Pictet, Traite Pal., 2d ed., 4, 1857, p. 301.—Angelin, Icon. Crinoid., 1878, p. 14.—Zittel, Handb. Pal., 1, 1879, p. 378.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 357. (Rev. Pal., pt. 3, sec. 1, p. 135.)—Ringueberg, Ann. New York Acad. Sci., 5, 1890, p. 302.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 675; 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1893, p. 260.—Weller, Jour. Geol., 5, 1897, p. 744, footnote; Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 117, fig. 47.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 164, fig. 77.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 149.—Zittel, Grundzuge Pal., 1, 1910, p. 164.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 192.

*Cryptodiscus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1865, pl. 11, fig. 8; rev. ed., 1868, pl. 11 (2), fig. 18.—Weller, Jour. Geol., 5, 1897, p. 744 (footnote pp. 803-808).—Anon. (?Bather), Nat. Sci., 12, 1898, p. 154.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 121.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 164.

**Callicrinus acanthinus** Ringueberg.

*Callicrinus acanthinus* Ringueberg, Ann. New York Acad. Sci., 5, 1890, p. 302, pl. 3, fig. 1.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., 20, Harvard, 1897, p. 356, pl. 83, fig. 18.

Niagaran (Lockport-Gasport member): Lockport, New York.

**Callicrinus beachleri** Wachsmuth and Springer.

*Callicrinus beachleri* Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 140; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 355, pl. 83, fig. 14a, b.

Niagaran (Laurel): St. Paul, Indiana.

**Callicrinus bifurcatus** Weller.

*Callicrinus bifurcatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 125, pl. 8, fig. 7.

Niagaran (Racine): Joliet, Illinois.

**Callicrinus bilobus** (Weller).

*Cryptodiscus bilobus* Weller, Jour. Geol., 5, 1897, p. 749, pl., fig. 8.

*Callicrinus bilobus* Weller, Jour. Geol., 5, 1897, p. 808; Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 125, pl. 10, fig. 4.

Niagaran: (Racine): Joliet, Illinois.

**Callicrinus cornutus** (Hall).

*Eucalyptocrinus cornutus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 322, pl. 11 (2), figs. 8-10; rev. ed., 1870, p. 363, pl. 11, figs. 8-10.—Whitfield, Geol. Wisconsin, 4, 1882, p. 285, pl. 16, figs. 5-8.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.



**Callierinus cornutus**—Continued.

*Eucalyptocrinus cornutus* var. *excavatus* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras 1865), 1867, p. 322, pl. 11 (2), figs. 6, 7; rev. ed. 1870, p. 364, pl. 11, figs. 6-7.

*Callierinus cornutus* Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 357, pl. 83, figs. 15-17.—Anon. (Bather?), Nat. Sci., 12, 1898, p. 155.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1900, p. 118, pl. 8, figs. 1-3.

Niagaran (Racine): Waukesha and Racine, Wisconsin; Bridgeport and Romeo, Illinois.

**Callierinus corrugatus** (Weller).

——— Miller, 18th Rep. Geol. Nat. Hist. Indiana, 1894, p. 260, pl. 1, fig. 7, (adv. sheets, 1892, p. 6, pl. 1, fig. 7).

*Cryptodiscus corrugatus* Weller, Jour. Geol., 5, 1897, p. 747, pl., figs. 1, 2; p. 808.

*Callierinus corrugatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 123, pl. 11, figs. 6, 7.

Niagaran (Racine): Joliet, Illinois

**Callierinus desideratus** Weller.

*Callierinus* ——— Weller, Jour. Geol., 5, 1897, pp. 805-806, figs. 2-4, 7-8.

*Callierinus desideratus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 122, pl. 9, fig. 2; pl. 10, fig. 3; pl. 11, figs. 1-3.

Niagaran (Racine): Racine, Wisconsin.

**Callierinus digitatus** (Weller).

*Cryptodiscus digitatus* Weller, Jour. Geol., 5, 1897, p. 749, pl., figs. 6, 7, 5?; p. 808.

*Callierinus digitatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 124, pl. 9, figs. 3, 4; pl. 11, fig. 5.

Niagaran (Racine): Lemont and Joliet, Illinois.

**Callierinus hydei** (Weller).

*Cryptodiscus hydei* Weller, Jour. Geol., 5, 1897, p. 748, pl., figs. 3, 4.

*Callierinus hydei* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 124, pl. 8, fig. 8; pl. 9, fig. 1; pl. 10, figs. 1, 2.

Niagaran (Racine): Romeo and Joliet, Illinois; Racine, Wisconsin.

**Callierinus longispinus** Weller.

*Callierinus longispinus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 119, pl. 8, figs. 4, 5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.

Niagaran (Racine): Joliet, Illinois.

**Callierinus pentangularis** Weller.

*Callierinus pentangularis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 120, pl. 8, fig. 6.

Niagaran (Racine): Bridgeport, Illinois.

**Callierinus? ramifer** (Roemer).

*Eucalyptocrinus ramifer* Roemer, Sil. Fauna., West Tennessee, 1860, p. 51, pl. 4, figs. 4a, 4b.

*Callierinus? ramifer* Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard. (N. A. Crin. Cam.), 20, 1897, p. 358.

Niagaran (Brownsport): Decatur and Wayne counties, Tennessee.

**CALLITHAMNOPSIS** Whitfield.Genotype: *Oldhamia fruticosa* Hall.

*Callithamnopsis* Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, pl. 354; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 42.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 721.—Ruedemann, Bull. New York State Mus., 133, 1900, p. 201.

**Callithamnopsis delicatula** Ruedemann.

*Callithamnopsis delicatula* Ruedemann, Bull. New York State Mus., 133, 1900, p. 203, pl. 1, fig. 5; pl. 2, figs. 1, 2.

Black River (Lowville): Glens Falls, New York.

**Callithamnopsis fruticosa** Whitfield.

*Oldhamia fruticosa* Hall (part), Canadian Org. Rem., dec. 2, 1865, p. 50 (name only).

*Callithamnopsis fruticosa* Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 354, pl. 11, figs. 4-8; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 42, pl. 4, figs. 4-8.—Ruedemann, Bull. New York State Mus., 133, 1900, p. 202, figs. 4-8, pl. 1, figs. 3, 4.

Black River (Platteville): Platteville, Wisconsin.

**CALLOCYSTIS** (part) Haeckel. (See *Callocystites* Hall.)**CALLOCYSTITES** Hall.Genotype: *C. jewetti* Hall.

*Callocystites* Hall, Pal. New York, 2, 1852, pp. 238, 248.—Chapman, Canadian Jour., n. s., 2, 1857, p. 303.—Pictet, *Traité Pal.*, 2d ed., 4, 1857, p. 298.—Hall, Pal. New York, 3, 1861, p. 151.—Zittel, *Handb. Pal.*, 1, 1879, p. 421.—Miller, N. A. Geol. Pal., p. 230.—Jaekel, *Stammesg. Pemat.*, 1, *Thecoidea u. Cystoidea*, 1899, p. 289.—Zittel-Eastman Textb. Pal., 1, 1900, p. 187.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 151; Bull. New York State Mus., 45, 1901, p. 151.—Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 242.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 188.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 469.

*Callocystis* Haeckel, *Amphorideen u. Cystoideen*, Leipzig, 1896, p. 131.—Bather, *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 62, fig. 31.

*Anthocystis* Haeckel, *Amphorideen u. Cystoideen*, Leipzig, 1896, p. 132, pl. 3, figs. 23, 24.—Bather, *Treatise on Zool.* (Lankester), pt. 3, 1900, p. 62.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 153.

(Genotype: *Anthocystis halliana* Haeckel = *Callocystites jewetti* Hall).

**Callocystites canadensis** (Billings).

*Apiocystites Canadensis* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 90.

*Callocystites canadensis* Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 245, pl. 34, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 470, fig. 1780.

*Callocystites tripectinatus* Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 12, pl. 1, fig. 10.

Clinton (Rochester): Grimsby, Ontario; Lockport, New York.

**Callocystites jewetti** Hall.

*Callocystites jewettii* Hall, Pal. New York, 2, 1852, p. 239, pl. 50, figs. 1-11, 12-18.—Pictet, *Traité Pal.*, 2d ed., 1857, 4, p. 298, pl. 99, fig. 15.—Miller, N. A. Geol. Pal., 1889, p. 230, fig. 260.—Jaekel, *Stammesg. Pemat.*, 1, *Thecoidea u. Cystoidea*, 1899, p. 290, fig. 64, p. 291, pl. 15, figs. 1, 1a-c.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 151, fig. 47; Bull. New York State Mus., 45, 1901, p. 151, fig. 47.—Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 243, fig. 35, pl. 34, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 469, fig. 1779.



**Callocystites Jewetti**—Continued.

*Callocystis Jewetti* Zittel, Handb. Pal., 1, Munich, 1879, p. 410, fig. 290; p. 421, fig. 297.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 131, pl. 3, figs. 21, 22.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 62, fig. 31.

*Anthocystis Halliana* Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 132, pl. 3, figs. 23, 24.

Clinton (Rochester): Lockport, New York, and vicinity; Grimsby, Ontario.

**CALLOCYSTITES TRIPECTINATUS** Ringueberg. See *Callocystites canadensis*.

**CALLOGRAPTUS** Hall.

Genotype: *C. elegans* Hall.

*Callograptus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 133; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 218; rev. ed., 1870, p. 252.—Nicholson, Mon. Brit. Graptolit., 1872, p. 128.—Hopkinson, Ann. Mag. Nat. Hist., 4th ser., 10, 1872, p. 233.—Zittel, Handb. Pal., 1, Munich, 1879, p. 289.—Spencer, Amer. Nat., 8, 1882, pp. 458–462, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, p. 20; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 562, 570.—Miller, N. A. Geol. Pal., 1889, p. 175.—Pöcta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 179.—Matthew, Trans. New York Acad. Sci., 14, 1895, p. 271, pl. 48, fig. 5.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 576.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 583, 584; Mem. 11, pt. 2, 1908, p. 146.

**Callograptus compactus** (Walcott).

*Dendrograptus compactus* Walcott, Trans. Albany Inst., 10, 1883, p. 21, pl. 1, fig. 1 (adv. sheets, 1879).—Gurley, Jour. Geol., 4, 1896, p. 94.

*Callograptus compactus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 146, fig. 52, pl. 1, fig. 1.

Utica: Holland Patent, Oneida County, New York.

**Callograptus diffusus** (Hall).

*Dendrograptus*? (*Callograptus*?) *diffusus* Hall, Canadian Org. Rem., dec. 2, 1865, p. 132, pl. 18, figs. 1–3; 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 4, fig. 12; rev. ed., 1870, p. 224, pl. 4, fig. 12.

*Dendrograptus*? *diffusus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 664, pl. 36, figs. 7a, 7b.

*Callograptus diffusus* Ruedemann, Ann. Rep. New York State Pal., 1902, p. 570.

*Callograptus* cf. *diffusus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 586–587, fig. 20, pl. 4, fig. 7.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Deepkill, Rensselaer County, New York (Deepkill).

Ordovician (Lower Arenig): Ramsey Island, Wales.

**Callograptus elegans** Hall.

*Callograptus elegans* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 134, pl. 19, figs. 1–4; pl. 18, fig. 4; 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 4, fig. 15; rev. ed., 1870, p. 224, pl. 4, fig. 15.—Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 666, pl. 36, fig. 9.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 577.

Canadian (Levis, *Didymograptus* zone): Gros Maule, Quebec; Newfoundland.

Ordovician (Lower Arenig): Wales.

**CALLOGRAPTUS GRABAU** Hahn. See *Dictyonema furciferum*.

**CALLOGRAPTUS GRANTI** Spencer. See *Odontocaulis granti*.



**Callograptus minutus** Spencer.

*Callograptus minutus* Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Trans. Acad. Sci. St. Louis, 4, 1884, p. 572, pl. 1, fig. 12; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 22, pl. 1, fig. 12.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 14, 15, fig. 13.

Niagaran dolomite: Hamilton, Ontario.

**Callograptus minutus altus** Gurley.

*Callograptus minutus altus* (Gurley MS.), Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 15, fig. 16.

Niagara dolomite: Hamilton, Ontario.

**Callograptus multicaulis** Spencer.

*Callograptus* (*Dendrograptus*) *multicaulis* Spencer, Canadian, 10, 1882, p. 165, nom. nud.

*Callograptus multicaulis* Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 572, pl. 1, fig. 11; Bull. Mus. Univ. State Missouri, 1, 1884, p. 22, pl. 1, fig. 11.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 13, fig. 14.

Niagaran dolomite: Hamilton, Ontario.

**Callograptus niagarensis** Spencer.

*Callograptus Niagarensis* Spencer, Canadian Nat., n. s., 8, 1878, p. 463; Trans. Acad. Sci. St. Louis, 4, 1884, p. 571, pl. 1, fig. 9; Bull. Mus. Univ. State Missouri, 1, 1884, p. 21, pl. 1, fig. 9.—Miller, N. A. Geol. Pal., 1889, p. 175, fig. 144.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Mus., 65, 1909, pp. 13, 14, fig. 15.

Niagaran dolomite: Hamilton, Ontario.

**Callograptus salteri** Hall.

*Callograptus salteri* Hall, Canadian Org. Rem., dec. 2, Geol. Surv. Canada, 1865, p. 135, pl. 19, figs. 5–8; 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 4, figs. 13, 14; rev. ed., 1870, p. 224, pl. 4, figs. 13, 14.—Hopkinson and Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 667, pl. 36, fig. 10.—Gurley, Jour. Geol., 4, 1896, p. 300.—Roemer and Frech, Leth. pal., 1, 1897, p. 577, fig. 146.—Ruedemann, Ann. Rep. New York State Pal., 1902, pp. 554, 555, 565.—Cleland, Bull. Amer. Pal., 4, 1903, p. 20, pl. 4, fig. 4.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 584–586, figs. 18, 19, pl. 3, figs. 13–15.

Canadian: Point Levis, Quebec (*Levis*, *Didymograptus*, and *Diplograptus dentatus* zones); Deepkill, Rensselaer County, New York (Deepkill); Tribes Hill and Fort Hunter, New York.

Ordovician (Middle Arenig): St. Davids, Wales.

**Callograptus strictus** Gurley.

*Callograptus strictus* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 15, fig. 17; pl. 3, fig. 3.

Niagaran dolomite: Hamilton, Ontario.

**CALLONEMA** Hall.

Genotype: *Loxonema bellatula* Hall.

*Callonema* Hall, Pal. New York, 5, pt. 2, 1879, p. 50.—Pilsbry, Zittel-Eastman Textb. Pal., 1, 1900, p. 458.

**Callonema pristina** Savage.

*Callonema pristina* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 117, pl. 7, fig. 20.

Upper Medinan (Channahon): Near Channahon, Will County, Illinois.

**CALLOPORA** Dybowski. See *Diplotrypa* Nicholson.

**CALLOPORA** Hall. See *Hallopora* Bassler.

**CALLOPORA ASPERA** Hall. See *Lioclema asperum*.

**Callopora?? cervicornis** Hall.

*Callopora cervicornis* Hall, Trans. Albany Institute, 10, 1883, p. 59 (abstract, 1879, p. 3); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 238.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without a restudy of the types.

**CALLOPORA CRENULATA** Ulrich. See *Halloporina crenulata*.

**Callopora?? diversa** Hall.

*Callopora? diversa* Hall, Trans. Albany Institute, 10, 1883, p. 60 (abstract, 1879, p. 4); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 239.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without a restudy of the types.

**CALLOPORA EXSUL** Hall. See *Lioclema? exsul*.

**CALLOPORA FLORIDA** Hall. See *Nicholsonella florida*.

**CALLOPORA LAMINATA** Hall. See *Fistulipora laminata*.

**CALLOPORA MILFORDENSIS** James. See *Ceramoporella granulosa milfordensis*.

**CALLOPORA NANA** Nicholson. See *Hallopora elegantula*.

**CALLOPORA NUMMIFORMIS** Hall. See *Mesotrypa nummiformis*.

**CALLOPORA OHIOENSIS** Foerste. See *Lioclemella ohioensis*.

**CALLOPORA RAMOSA** var. *RUGOSA* of authors. See *Hallopora rugosa*.

**CALLOPORA SIGILLARIOIDES** Nickles. See *Hallopora onealli sigillarioides*.

**CALLOPORA SINGULARIS** Hall. See *Trematopora? singularis*.

**CALLOPORELLA** Ulrich. Genotype: *Calloporella harrisi* Ulrich=*Monticulipora* (Heterotrypa) *circularis* James.

*Calloporella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154.—Miller, N. A. Geol. Pal., 1889, p. 296.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 373, 418.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1907, p. 36.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.

**Calloporella circularis** (James).

*Monticulipora* (Heterotrypa), *circularis* James, Paleontologist, No. 6, 1882, p. 46.

*Monticulipora circularis* James, Paleontologist, No. 7, 1883, p. 58, pl. 1, figs. 3, 3a.

*Calloporella harrisi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 91, pl. 1, figs. 5, 5c.

*Monticulipora lens* (not *Nebulipora lens* McCoy) James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 165.—J. F. James, *ibid.*, 16, 1894, p. 181.

*Calloporella circularis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 193.—Bassler, Proc. U. S. Nat. Mus., 1906, p. 25.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 797, pl. 10, figs. 6, 6c.

Richmond (Waynesville): Oxford, Waynesville, etc., Ohio; Indiana.

*Plesiotype*.—Cat. No. 40386, U.S.N.M. (Holotype of *C. harrisi*).

**CALLOPORELLA HARRISI** Ulrich. See *Calloporella circularis*.

**Calloporella? lens** (Whitfield).

*Fistulipora lens* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 69; Geol. Surv. Wisconsin, 4, 1882, p. 256, pl. 11, figs. 5, 6.—Buell, Trans. Wisconsin Acad. Sci., 5, 1882, p. 188.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 173, fig.

**Calloporella? lens**—Continued.

Calloporella? lens Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 194 (gen. ref.).

Richmond (Maquoketa): Delafield, Wisconsin.

**Calloporella? nodulosa** Ulrich.

Calloporella? nodulosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 418, pl. 33, figs.

4, 4a.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 194.

Monticulipora verrucosa J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 85.

Richmond (Maquoketa): Savannah, Illinois.

**CALLOPORELLA? NUMMIFORMIS** Ulrich. See *Mesotrypa nummiformis*.

**CALLOPORINA** Ulrich and Bassler. See *Halloporina* Bassler.

**CALOPHYLLUM PHRAGMOCERAS** Salter. See *Amplexus phragmoceras*.

**CALOSTYLIS** Lindström.

Genotype: *C. denticulata* Kjerulf.

Calostylis Lindström, Ofver K. Vet.-Akad. Forhandl., 25, 1868, p. 421.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 63.—Zittel, Handb. Pal., 1, 1879, p. 241.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 393.—Frech, Paläontographica, 37, 1890, p. 43.—Koken, Die Leitfossilien, 1896, p. 307.

**Calostylis spongiosa** Foerste.

Calostylis spongiosa Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 322, pl. 7, figs. 3a-g; pl. 8, figs. 1a, b.

Clinton (Waco): Near Estill Springs, etc., Kentucky.

**CALVINELLA** Walcott.

Genotype: *Dikelocephalus spiniger* Hall.

Calvinella Walcott, Smiths. Misc. Coll., 57, 1914, p. 388.

**Calvinella newtonensis** (Weller).

*Dikelocephalus newtonensis* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 121, pl. 3, figs. 1-7.

Calvinella newtonensis Walcott, Smiths. Misc. Coll., 57, 1914, p. 389, pl. 70, figs. 7-11, 11a

Upper Cambrian or Ozarkian (Kittatinny): Near Newton, New Jersey.

**Calvinella ozarkensis** Walcott.

Calvinella ozarkensis Walcott, Smiths. Misc. Coll., 57, 1914, p. 389, pl. 70, figs. 1-6.

Ozarkian (Eminence): Near Eminence, Shannon County, and near Flat River, St. Francois County, Missouri.

**Calvinella tenuisculpta** Walcott.

Calvinella tenuisculpta Walcott, Smiths. Misc. Coll., 57, 1914, p. 391, pl. 64, figs. 7, 7a.

Pogonip (?Ozarkian): Ridge east of Hamburg Ridge, Eureka District, Nevada.

**CALVINIA** Savage.

Genotype: *C. edgewoodensis* Savage.

Calvinia Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 65.

**Calvinia edgewoodensis** Savage.

Calvinia edgewoodensis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 66, pl. 2, figs. 15-17.

Upper Medinan (Edgewood): Near Gale, Alexander County, Illinois.



**CALYMENE** Brongniart.Genotype: *Trilobus tuberculatus* Bronn.

*Calymene* Brongniart, Hist. Nat. Crust. Foss., 1822, p. 11.—Dekay, Annals Lyceum Nat. Hist. New York, 1, 1824, p. 175, footnote.—Eichwald, Zool. Specialis, pt. 2, Vilnae, 1830, p. 114.—Green, Mon. Tril. N. A., 1832, pp. 15, 27.—Eaton, Geol. Textbook, 2d ed., 1832, p. 31.—Steininger, Mem. Soc. Geol. France, 1, 1834, p. 350.—Murchison, Sil. Syst., 1839, p. 653.—Conrad, 5th Ann. Rep. New York Geol. Surv. 1841, p. 38.—Burmeister, Org. der Tril., 1843, p. 93.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 558.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 85, pl. 5, fig. 50.—Rouault, Bull. Soc. Geol. France, 2d. ser., 4, 1847, p. 318.—Salter, Mem. Geol. Surv. Great Britain, 2, pt. 1, 1848, p. 341.—McCoy, Ann. Mag. Nat. Hist., 2d. ser., 4, 1849, p. 399.—Salter, Mem. Geol. Surv. United Kingdom, dec. 2, 1849, pl. 8.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 778; Syst. Sil. Centre Boheme, 1, 1852, p. 560.—McCoy, British Pal. Rocks and Fossils, 1854, p. 164.—Pictet, Traité Pal., 2d ed., 2, 1854, p. 503.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 213.—Chapman, Canadian Jour., n. s., 1, 1856, p. 285.—Nieszkowski, Archiv für Naturk. Liv-, Ehst- und Kurl., 50, 1857, p. 540.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31; Expos. Min. Geol. Canada, 1864, p. 139.—Salter, Mon. British Tril., Pal. Soc., 1865, p. 90; Cat. Camb. and Sil. Foss., 1873, pp. 52, 132.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 139, 140.—Zittel, Handb. Pal., 2, 1885, p. 604.—Clarke, Jour. Morphology, 2, 1888, p. 254.—Hall and Clarke, Pal. New York, 7, 1888, p. xxi, fig. 22.—Miller, N. A. Geol. Pal., 1889, p. 536.—W. D. Matthews, Trans. New York Acad. Sci., 12, 1893, p. 238.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th, ser., 42, 1894, pp. 7, 11.—Walcott, Geol. Mag., dec. 4, 1, 1894, p. 247.—Koken, Die Leitfossilien, Leipzig, 1896, p. 23, fig. 14, 1-3.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 105, pl. 3, fig. 26.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 48.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 224; Bull. New York State Mus., 45, 1901, p. 224.—Jaekel, Zeitz. d. d. geol. Gesell., 53, 1901, pp. 149, 156.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 314.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 66.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724.

*Calymmene* Angelin, Pal. Scandinavica, 3d ed., Holmiæ, 1878, pp. 22, 28.—Pompeckj, Neues Jahrb. f. Min., Geol., Pal., 1, 1898, pp. 187, 196, 217.—Beecher, Zittel-Eastman Textb. Pal., 1, 1900, p. 634; Amer. Jour. Sci., 4th ser., 13, 1902, p. 167.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1051.

***Calymene abbreviata*** Foerste.

*Calymene abbreviata* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 83, pl. 3, fig. 17; Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 148.

Trenton (Cynthiana): One mile south of Rogers Gap, Kentucky.

***Calymene altirostris*** Van Ingen.

*Calymene altirostris* Van Ingen, School of Mines Quart., 23, 1901, p. 35 (nom. nud.) Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**CALYMENE BECKII** Hall. See *Triarthrus becki*.**CALYMENE BLUMENBACHII** Foerste. See *Calymene vogdesi*.**CALYMENE BLUMENBACHII** Roemer. See *Calymene niagarensis*.**CALYMENE BLUMENBACHII** Green. See *Calymene senaria*.

*CALYMENE BLUMENBACHII* var. *NIAGARENSIS* Hall. See *Calymene niagarensis*.

*CALYMENE BLUMENBACHII* var. *SENARIA*? Hall. See *Calymene clintoni* and *C. senaria*.

*CALYMENE BLUMENBACHII* var. *VOGDESI* Foerste. See *Calymene vogdesi*.

*CALYMENE BUCKLANDII* Anthony. See *Ceraurus milleranus*.

*CALYMENE CALLICEPHALA* Cumings. See *Calymene meeki*.

*Calymene callicephala* Green.

*Calymene callicephala* Green, Mon. Tril. N. A., 1832, p. 30, cast 2.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 699, fig. 2.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 83.—Ruedemann, Pal. Univ., 4th ser., fasc. 1, 1912, p. 233. Ordovician(?): Hampshire, Virginia (=Hampshire County, West Virginia).

Observation.—Of the numerous references to this species, the above only refer directly to Green's types, which are lost. Green's cast of the type can not be identified with any of the species of *Calymene* and the name might as well be abandoned.

*CALYMENE CALLICEPHALA GRANULOSA* Foerste. See *Calymene granulosa*.

*Calymene camerata* Conrad.

*Calymene camerata* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 1st ser., 8, 1842, p. 278.—Hall, Pal. New York, 2, 1852, p. 337, pl. 78, figs. 1a-1f.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 250, pl. 22, figs. 22-25.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 494, pl. 89, fig. 9.

Cayugan (Cobleskill): Schoharie, New York.

Helderbergian: Cash Valley, Devils Backbone, Maryland; Keyser, West Virginia (Keyser); Nearpass Quarry, New Jersey (Decker Ferry).

*CALYMENE CHRISTYI* Hall. See *Synhomalonotus christyi*.

*Calymene clintoni* (Vanuxem).

*Hemicrypturus clintonii* Vanuxem, Geol. New York, pt. 3, 1842, p. 79, fig. 2.

*Hemicrypturus* tail Hall, Geol. New York, pt. 4, 1843, p. 77, tab. org. rem., 9, fig. 2.

*Calymene blumenbachii*? var. *senaria* Hall, Pal. New York, 2, 1852, p. 299, pl. A 66, figs. 6a-6e.

*Calymene clintoni* Hall, Pal. New York, 2, 1852, p. 298, pl. A 66, figs. 5a-5d.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 637.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 109, figs.—Foerste, Cincinnati Soc. Nat. Hist., Jour. 21, 1909, p. 33, pl. 1, fig. 6.

Clinton: Herkimer and Cayuga Counties, New York; Kentucky, etc.

*CALYMENE CLINTONI* Vogdes. See *Calymene vogdesi*.

*Calymene conradi* Emmons.

Not recognized.

*Calymene conradi* Emmons, Amer. Geol., 1, pt. 2, 1855, p. 236.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 320.

Lorraine shales: New York.

Observation.—Probably refers to the species or variety of *Calymene* occurring at this horizon.

*CALYMENE CRASSIMARGINATUS* Hall. See *Proetus crassimarginatus*.

**Calymene diops** Green.

*Calymene diops* Green, Mon. Tril. N. A., 1832, p. 37, cast No. 8, fig. 2.

Ordovician?: Horizon and locality unknown.

Observation.—Not recognized. Possibly a *Phacops*.

**Calymene dubia** Savage.

*Calymene dubia* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 60, pl. 2, figs. 8, 9.

Upper Medinan (Girardeau): Alexander County, Illinois.

**Calymene fayettensis** Slocum.

*Calymene fayettensis* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 67, pl. 16, figs. 8, 9.

Richmond (Maquoketa): Clermont, Elgin, and Bloomfield, Iowa.

**Calymene gracilis** Slocum.

*Calymene gracilis* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 69, pl. 18, fig. 9.

Richmond (Maquoketa): Pattersons Springs, near Brainard, Iowa.

**Calymene granulosa** (Foerste).

*Calymene callicephala granulosa* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 294.

Eden: Cincinnati, Ohio, and vicinity; New York (Indian Ladder).

**Calymene macrophthalma** D'Orbigny.

*Calymene macrophthalma* D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1847, p. 32, 8, Atlas, pl. 1, figs. 6, 7.

Silurian: Rio Grande, Bolivia.

**Calymene mammillata** Hall.

*Calymene mammillata* Hall, Geol. Surv. Wisconsin, 1861, p. 50; Geol. Wisconsin, 1, 1862, p. 432, figs. 1, 2.

Richmond (Maquoketa): Maquoketa Creek, twelve miles west of Dubuque, Iowa.

**Calymene meeki** Foerste.

*Calymene senaria* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 173, pl. 14, figs. 14a-f.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 140.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 493, pl. 2, figs. 1, 2.

*Calymene callicephala* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1057, pl. 54, figs. 6-6c.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 14, figs. 16, 17.

*Calymene meeki* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 84, pl. 3, fig. 18.—Raymond, Zittel-Eastman Textb. Pal. 1913, p. 724.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Kentucky; Indiana; Tennessee; etc.

**Calymene meeki retrorsa** Foerste.

*Calymene meeki-retrorsa* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 85, pl. 3, fig. 19.

Richmond (Waynesville): Near Dunlapville, Indiana.

**CALYMENE MICRIPS** Green. See *Pterygometopus microps*.**Calymene multicosta** Hall.

*Calymene multicosta* Hall, Pal. New York, 1, 1847, p. 228, pl. 69, fig. 3; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67.—Brainerd and Seely, Bull. Amer. Mus. Nat. Hist., 1890, 3, p. 22.



**Calymene multicosta**—Continued.

"Birdseye": Ile la Motte, Lake Champlain, Vermont.

Observation.—Not recognized. Possibly the same as *Pliomerops canadensis*, but original is too poorly preserved to decide.

**CALYMENE NASUTA** Ulrich. See *Calymenella nasuta*.

**Calymene niagarensis** Hall.

*Calymene niagarensis* Hall, Geol. New York, pt. 4, 1843, p. 102, fig. 3, p. 101, tab. org. rem., 10, fig. 3.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 309, fig. 3.—Hall, Canadian Nat. Geol., 5, 1860, p. 156; Trans. Albany Inst., 4, 1863, p. 227; adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1865, p. 30; 20th Rep., rev. ed., 1870, p. 425.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 153, pl. 6, figs. 14, 15.—Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 32, figs. 8–15; mus. ed., 1879, p. 187, pl. 32, figs. 8–15; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 331, pl. 34, figs. 8–15.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Hall and Clarke, Pal. New York, 7, 1888, pl. 1, figs. 10–14.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 109, fig.—Keyes, Geol. Surv. Missouri, 4, 1894, pl. 32, fig. 5.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903 (p. 2), p. 107, pl. 21, fig. 12.—Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, 1904, App. F, p. 57; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 269.—Rowley, Green's Contr. Indiana Pal., 2, pt. 2, 1906, p. 27, pl. 5, fig. 26.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1907, p. 261, pl. 23, figs. 9, 10.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 34.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 315, fig. 1628.

*Calymene Blumenbachii* Chapman, Canadian Jour., n. s., 8, 1863, p. 31, fig. 147; p. 206, fig. 209.—Roemer, Sil. Fauna West Tennessee, 1860, p. 79, pl. 5, fig. 22.—Billings, Cat. Sil. Foss. Anticosti, Acad. Geol., 2d ed., 1868, p. 607.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 109, fig.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 2, 1895, p. 106.

*Calymene blumenbachii* var. *niagarensis* Hall, Pal. New York, 2, 1852, p. 307, pl. 67, figs. 11–12 (see for earlier synonymy); Geol. Surv. Wisconsin, 1, 1862, p. 432; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 334.—Grabau, Bull. New York State Mus., 45, 1901, p. 224, fig. 156.

*Calymene* sp. Hall, Pal. New York, 2, 1852, p. 350, pl. 83, fig. 8.

Brassfield-Cayugan: Lockport, Rochester, etc., New York. Wide distribution in the United States and Canada, especially in the Niagaran.

**CALYMENE PHLYCTAINOIDES** Green. See *Corydocephalus phlyctainoides*.

**Calymene platycephala** Foerste.

*Calymene platycephala* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 81, pl. 2, fig. 7; pl. 3, fig. 21.

Trenton (Saltillo): Clifton, Tennessee.

**CALYMENE ROSTRATA** Vogdes. See *Calymenella rostrata*.

**Calymene rugosa** Shumard.

*Calymene rugosa* Shumard, 1st and 2d Reps. Geol. Missouri, 1855, p. 200, pl. B, fig. 14.—Keyes, Missouri Geol. Surv., 4, 1895, p. 233.

Helderbergian(?): One mile below Birmingham, Missouri.

**CALYMENE SELENECEPHALA** Green. See *Calymene senaria*.

**CALYMENE SENARIA** Meek. See *Calymene meeki*.

***Calymene senaria* Conrad.**

*Calymene blumenbachii* Green, Mon. Tril. N. A., 1832, p. 28, cast 1.

*Calymene selenicephala* Green, Mon. Tril. N. A., 1832, p. 31, cast 3.—Edwards, Hist. Nat. Crust., 3, 1840, p. 320.

*Calymene senaria* Conrad, 5th Ann. Rep. Geol. Surv. New York, 1841, pp. 38, 49.—Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 390, fig. 2.—Vanuxem, *ibid.*, 3, 1842, pp. 48, 55.—Owen (Emmons), Amer. Jour. Sci., 47, 1844, pp. 363, 364, fig. 2.—Hall, Pal., New York, 1, 1847, p. 238, pl. 64, figs. 3a-n.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 213, pl. 15, fig. 16; p. 216, fig. 9.—Billings, Canadian Nat. Geol., 1, 1856, p. 46, fig. 10.—Emmons, Man. Geol., 1860, p. 98, fig. 87.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 8.—Hitchcock, Geol. Vermont, 1, 1861, p. 300, fig. 213.—Salter, Mon. Brit. Tril., Pal. Soc., 1865, p. 97, pl. 9, figs. 5-11.—Billings, Quart. Jour. Geol. Soc. London, 26, 1870, p. 485, pl. 32, figs. 3-5.—Walcott, 23th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pp. 89-91; Mus. ed., 1879, pp. 89-91.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 591.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 582 (loc. occ.).—Walcott 31st Rep. New York State Mus. Nat. Hist., 1879, p. 61, pl. 1, figs. 1, 2, 5; Bull. Mus. Comp. Zool., 8, 1881, pp. 198-216, pl. 1, figs. 6-10; pl. 2, figs. 5, 7, 10; pl. 3, figs. 1, 3, 8-10; pl. 4, fig. 3; pl. 5, figs. 1-6; pl. 6, figs. 1, 2.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Walcott, Science, 3, 1884, pp. 279, 281, figs. 2, 3; Notes on some sections of Tril., 1887, pl. 1.—Clarke, Jour. Morph., 2, 1888, p. 254, footnote; p. 266, footnote.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 110, figs.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 700, fig. 3.—Keyes, Geol. Surv. Missouri, 4, 1894, p. 230.—Bernard, Quart. Jour. Geol. Soc. London, 1894, 50, p. 427, figs. 13, 15.—Walcott, Geol. Mag., dec. 4, 1, 1894, p. 247, pl. 8, figs. 7-10; Proc. Biol. Soc. Washington, 9, 1894, p. 90, pl. 1, figs. 7-10.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 231.—Pompeckj, N. Jahrb. Min., 1, 1898, pp. 197, 198 (footnote), 244, 246.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 67.—Beecher, Amer. Jour. Sci., 4th ser., 13, 1902, pl. 5, fig. 7.—Beecher, Geol. Mag., dec. 4, 9, 1902, p. 158, fig. 4.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 203, pl. 15, fig. 23.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 315, fig. 1624c, d.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 82, pl. 2, fig. 14.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 120, pl. 9, figs. 6-10, *Calymene blumenbachii* var. *senaria* Hall, Pal. New York, 2, 1852, p. 299, pl. 66a, figs. 6a-e.

Trenton: New York, New Jersey, Ohio, Minnesota, etc.

*Plastotypes*.—Cat. Nos. 4916, 5004, U.S.N.M.

**CALYMENE SPINIFERA** Conrad. See *Cyphaspis girardeauensis*.

**CALYMENE? TRISULCATA** Hall. See *Phacops trisulcatus*.

***Calymene verneuilli* D'Orbigny.**

*Calymene Verneuilli* D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1847, p. 31, 8, Atlas, pl. 1, figs. 4, 5.

Silurian: Chuquisaca, Bolivia.

***Calymene vogdesi* Foerste.**

*Calymene clintoni* Vogdes (not Vanuxem) Proc. Acad. Nat. Sci. Philadelphia, 1880, p. 178, figs. 3, 4; Pal. Cont., 1, 1881, p. 9, figs. 3-7; Desc. New Crust. Clint. of Georgia, etc., 1886, p. 6, figs. 3-4.

*Calymene blumenbachii*? Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 110, pl. 13, fig. 25.



**Calymene vogdesi**—Continued.

*Calymene blumenbachii* var. *vogdesi* Foerste, Proc. Bost. Soc. Nat. Hist., 1890, 24, p. 265.

*Calymene blumenbachii* (or *senaria*) Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 55, pl. 8, fig. 1.

*Calymene* — Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 109, pl. 13, fig. 24.

*Calymene vogdesi* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 95, pl. 8, figs. 12–16; Geol. Surv. Ohio, 7, 1895, p. 526, pl. 25, figs. 24–25; pl. 27, figs. 12–16.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 315.

Upper Medinan (Brassfield): Catoosa Station, etc., Georgia; Centerville, Dayton, etc., Ohio; Indiana.

**CALYMENELLA** Bergeron.

Genotype: *C. boisseli* Bergeron.

*Calymenella* Bergeron, Bull. Soc. Geol. France, 3d ser., 18, 1890, p. 367.

**Calymenella nasuta** (Ulrich).

*Calymene nasuta* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 131, figs. 1–3, p. 132.

*Calymenella nasuta* Pompeckj, Neues Jahrb. Min., Geol. Pal., 1, 1898, p. 243.

Clinton (Osgood): Osgood, Indiana.

*Cotype*.—Cat. No. 41871, U.S.N.M.

**Calymenella rostrata** (Vogdes).

*Calymene rostrata* Vogdes, Amer. Jour. Sci., 3d ser., 18, 1879, p. 477; Proc. Acad. Nat. Sci. Philadelphia, 1880, p. 176, figs. 1–2; Pal. Cont., 1, 1881, p. 8, pl., figs. 1, 2; Desc. New Crust. Clint. of Georgia, etc., 1886, p. 2, 4, figs. 1–2.—Foerste, Proc. Bost. Soc. Nat. Hist., 24, 1890, p. 267.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 315.

*Calymenella rostrata* Pompeckj, Neues Jahrb. Min., Geol. Pal., 1, 1898, p. 243.

Clinton: Catoosa Station, Georgia; New York.

**CALYPTOGRAPTUS** Spencer.

Genotype: *C. cyathiformis* Spencer.

*Calyptraptus* Spencer, Canadian Nat., n. s., 8, 1878, p. 459.—Lapworth, Quart. Jour. Geol. Soc. London, 37, 1881, p. 173.—Spencer, Proc. Amer. Assoc. Adv. Sci., 31, 1883, p. 364; Bull. Mus. Univ. State Missouri, 1, 1884, p. 27; Trans. Acad. Sci. St. Louis, 4, 1884, p. 562, 577.—Miller, N. A. Geol. Pal., 1889, p. 175.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.

**CALYPTOGRAPTUS?** *ARBUSCULUS* Spencer. See *Dictyonema arbuscula*.

**Calyptraptus cyathiformis** Spencer.

*Calyptraptus cyathiformis* Spencer, Canadian Nat., n. s., 8, 1878, p. 459; Trans. Acad. Sci. St. Louis, 4, 1884, p. 578, pl. 3, fig. 3; Bull. Mus. Univ. State Missouri, 1, 1884, p. 28, pl. 3, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 175, fig. 145.—Gurley, Jour. Geol., 1896, pp. 93, 308.—Bassler, Bull. U. S. Nat. Mus., 1909, 65, pp. 38, 39, fig. 48.

Niagaran dolomite: Hamilton, Ontario.

**Calyptraptus micronematodes** Spencer.

*Calyptraptus micronematodes* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 579, pl. 3, figs. 4, 4a; Bull. Mus. Univ. State Missouri, 1, 1884, p. 29, pl. 3, figs. 4, 4a.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 39, 40, figs. 49, 50.

Niagaran dolomite: Hamilton, Ontario.



**Calypotegraptus? radiatus** Spencer.

*Calypotegraptus radiatus* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci., St. Louis, 4, 1884, p. 580, pl. 4, fig. 3; Bull. Mus. Univ. State Missouri, 1, 1884, p. 30, pl. 4, fig. 3.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 40, fig. 51.  
Niagaran dolomite: Hamilton, Ontario.

**CALYPTOGRAPTUS SUBRETIFORMIS** Spencer. See *Dictyonema subretiforme* and *D. polymorphum*.

**CAMARELLA** Billings.Genotype: *C. volborthi* Billings.

*Camarella* Billings, Canadian Nat. Geol., 4, 1859, p. 301; 6, 1861, p. 316.—Zittel, Handb. Pal., 1, 1880, p. 692.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1883, p. 412.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 122.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 48.—Miller, N. A. Geol. Pal., 1889, p. 338; 2d App., 1897, p. 759.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 219; 13th Ann. Rep. New York State Geol., 1895, p. 838.—Koken, Die Leitfossilien, Leipzig, 1896, p. 244.—Huene, Verh. d. Russ.-Kais. Mineral Gesell. zu St. Petersburg, 38, 1900, p. 228, fig. 1.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 321.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 271.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 394.

**Camarella ambigua** (Hall).

*Atrypa ambigua* Hall, Pal. New York, 1, 1847, p. 143, pl. 33, figs. 8, 9.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 190, pl. 10, figs. 8, 9, 8c.  
*Triplesia? ambigua* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 65.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1224, figs.  
*Camarella ambigua* Miller, Amer. Pal. Foss., 1879, p. 107.  
Trenton: Middleville, New York.

**CAMARELLA BERNENSIS** Sardeson. See *Parastrophia hemiplicata*.

**CAMARELLA BISULCATA** Miller. See *Cyclospira bisulcata*.

**Camarella breviplicata** Billings.

*Camarella breviplicata* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 304, fig. 295.  
Canadian (Beekmantown): Stanbridge, Quebec.

**CAMARELLA CALCIFERA** Billings. See *Syntrophia calcifera*.

**CAMARELLA CONGESTA** Nettelroth. See *Hyattidina congesta*.

**Camarella(?) costata** Billings.

*Camarella? costata* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 305, fig. 296.  
Canadian (Beekmantown): Stanbridge, Quebec.

**CAMARELLA EXTANS** Lesley. See *Triplesia extans*.

**CAMARELLA HEMIPLICATA** Billings. See *Parastrophia hemiplicata*.

**Camarella inornata** Weller.

*Camarella inornata* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 157, pl. 10, figs. 8–10.  
Black River (Jacksonburg): Hainesburg, New Jersey.

**CAMARELLA LENTICULARIS** Billings. See *Parastrophia lenticularis*.

**Camarella longirostris** Billings.

*Camarella longirostra* Billings, Canadian Nat. Geol., 4, 1859, p. 302; p. 445, fig. 23; Geol. Canada, 1863, p. 127, fig. 53.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 249, pl. 36, figs. 29, 30.

*Triplecia gracilis* Raymond, Bull. Amer. Pal., 3, 1902, p. 303, pl. 18, fig. 1.

Chazyan: Mingan Islands, Canada (Mingan); Crown Point, Valcour Island, Chazy, and Valcour, New York (Day Point, Valcour); East Tennessee (Lenoir).

**CAMARELLA NUCLEUS** Lesley. See *Triplecia nucleus*.

**CAMARELLA OPS** Billings. See *Parastrophia ops*.

**CAMARELLA OWATONNENSIS** Sardeson. See *Cyclospira bisulcata*.

**Camarella panderi** Billings.

*Camarella panderi* Billings, Canadian Nat. Geol., 4, 1859, p. 302; Geol. Canada, 1863, p. 143, fig. 78.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 220, pl. 62, figs. 19–23.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 250, pl. 36, figs. 31, 32.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada; Curdsville, Kentucky.

**Camarella parva** Billings.

*Camarella parva* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 219.—Matthew, Trans. Royal Soc. Canada, 11, 1893, p. 103, pl. 7, fig. 9.

Chazyan (Quebec—N, P): Table Head and four miles northeast Portland Creek, Newfoundland.

Canadian (Bretonian—Div. C 3a): St. John, New Brunswick.

**Camarella polita** Billings.

*Camarella polita* Billings, Pal. Foss., 1 Geol. Surv. Canada, 1865, pp. 304, 305, fig. 297.

? Canadian (Beekmantown): Stanbridge and Island of Orleans, Quebec.

**Camarella varians** Billings.

*Camarella varians* Billings, Canadian Nat. Geol., 4, 1859, p. 445, fig. 24; Geol. Canada, 1863, p. 127, fig. 52; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 220.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 271, fig. 326.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 250, pl. 36, figs. 19–27, 33–36.

Chazyan: Mingan Islands, Gulf of St. Lawrence (Mingan); Table Head, four miles northeast Portland Creek, and south side of Cow Point, Newfoundland (Quebec N, P); Crown Point, Valcour Island, Plattsburg, Chazy, etc., New York (Crown Point, Valcour), East Tennessee (Lenoir).

**Camarella volborthi** Billings.

*Camarella volborthi* Billings, Canadian Nat. Geol., 4, 1859, p. 301; Geol. Canada, 1863, p. 143, fig. 77.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 220, pl. 62, figs. 11–18; pl. 84, fig. 42.—Miller, N. A. Geol. Pal., 1889, p. 338, fig. 546.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

**CAMARIUM** Hall. See *Merista* Suess.

**CAMARIUM ELONGATUM** Hall. See *Merista* typa.

**CAMARIUM TYPUM** Hall. See *Merista* typa.

**CAMAROCLADIA** Ulrich and Everett.

Genotype: *C. dichotoma* Ulrich and Everett.

*Camarocladia* Ulrich and Everett in Miller, N. A. Geol. Pal., 1889, p. 156; Geol. Surv. Illinois, 8, 1890, p. 280.



**Camarocladia dichotoma** Ulrich and Everett.

*Camarocladia dichotoma* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 281, pl. 7, figs. 1, 1a, b.

Black River (Platteville): Near Dixon, Illinois.

Sections of *cotypes*.—Cat. No. 46549, U.S.N.M.

**Camarocladia rugosa** Ulrich.

*Camarocladia rugosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. xcv, footnote.

Black River (Decorah): Mercer County, Kentucky; Goodhue County, Minnesota.

*Cotypes*.—Cat. No. 49833, U.S.N.M.

**CAMAROCRINUS** Hall.

Genotype: *C. stellatus* Hall.

*Camarocrinus* Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, pp. 205-6; ext., with additions, 1880, pp. 3-5.—Zittel, Grundzuge Pal., 1895, p. 154.—Zittel-Eastman, Textb. Pal., 1896, p. 183.—Haeckel, Die Amphorideen Cystoideen, Leipzig, 1896, pp. 168, 169.—Barrande and Waagen, Syst. Sil. du Centre Boheme, 7, pt. 1, 1897, p. 1.—Bather, Treatise on Zool., 3, Echinoderma, 1900, pp. 77, 136, 161.—Foerste, Jour. Geol., 11, pp. 683-685.—Schuchert, Smiths. Misc. Coll., 47, p. 253.

**Camarocrinus stellatus** Hall.

*Camarocrinus stellatus* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 207, pl. 35, figs. 1-8; ext., 1880, p. 5, pl. 35, figs. 1-8.—Schuchert, Smiths. Misc. Coll., 47, 1904, p. 269, pl. 44, figs. 1-5; Maryland Geol. Surv., Low. Dev., 1913, p. 227, pl. 31, figs. 1-5.

Helderbergian: Schoharie, New York (Manlius transition bed); Keyser, West Virginia; Devils Backbone, near Cumberland, Maryland (Keyser).

*Plesiotypes*.—Cat. No. 35080, U.S.N.M.

**CAMAROTÆCHIA** Hall and Clarke.

Genotype: *Atrypa congregata* Conrad.

*Camarotæchia* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 189; 13th Ann. Rep. New York State Geol., 1895, p. 826.—Girty, Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 538.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 229.—Williams, Bull. U. S. Geol. Surv., 165, 1900, p. 59.—Schuchert, Zittel-Eastman, Textb. Pal., 1, 1900, p. 324.—Grabau, Bull. New York State Mus., 45, 9, 1901, p. 192; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 190.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 283.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 219.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 397.

*Stegerhynchus* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 98.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 397 (Genotype: *Camarotæchia whitei* Hall).

**Camarotæchia(?) acinus** (Hall).

*Rhynchonella acinus* Hall, Trans. Albany Inst., 4, 1863, p. 215; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 163, pl. 26, figs. 7-11; 11th Rep. State Geol. Indiana, 1882, p. 306, pl. 26, figs. 7-11.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 73, pl. 26, figs. 6, 13, 14, pl. 32, figs. 13-16.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 35, pl. 4, figs. 9-11.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 882, figs.

*Camarotæchia?* *acinus* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau, Bull. New York State Mus., 45, 1901, p. 193, fig. 108; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 193, fig. 108.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 284, figs. 347, 348.

*Camarotæchia* cf. *acinus* Kindel and Breger, 28th Ann. Rep. Nat. Res. Indiana, 1904, p. 439, pl. 8, figs. 1, 2.



**Camarotoechia(?) acinus**—Continued.

Niagaran: Waldron, etc., Indiana; Newsom, etc., Tennessee (Waldron); Louisville, Kentucky (Louisville); Pendleton, Indiana; etc.

*Plesiotypes*.—Cat. No. 51366, U.S.N.M. (Nettelroth).

**Camarotoechia(?) acinus convexa** (Foerste).

Rhynchonella acinus var. convexa Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 318, pl. 6, fig. 13; Geol. Ohio, 7, 1895, p. 593, pl. 31, fig. 13.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 164.

Upper Medinan (Brassfield): Hanover, Indiana.

**Camarotoechia acinus subrhomboidea** Foerste.

Camarotoechia acinus-subrhomboidea Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 12, pl. 2, fig. 4.

Clinton (West Union): Near Martins, Lewis County, Kentucky.

**Camarotoechia æquiradiata** (Hall).

Atrypa equiradiata Hall, Pal. New York, 2, 1852, p. 70, pl. 23, fig. 5.

Rhynchospira? equiradiata Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

Rhynchonella æquiradiata Miller, N. A. Geol. Pal., 1889, p. 367.

Camarotoechia æquiradiata Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.

Protorhyncha æquiradiata Hall and Clarke, *ibid.*, 1895, pl. 56, figs. 7-9.

Clinton: Oneida County, New York; Arisaig, Nova Scotia.

**CAMAROTÆCHIA ALTILIS** Hall and Clarke. See *Camarotoechia plena*.

**Camarotoechia? antiqua** Savage.

Camarotoechia? antiqua Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 82, pl. 5, figs. 1, 2.

Upper Medinan (Edgewood): Alexander County, Illinois, and near Edgewood, Missouri.

**Camarotoechia argentea** (Billings).

Rhynchonella? argentea Billings, Cat. Sil. Foss. Anticosti, 1866, p. 43.

Anticostian (Jupiter River): East of Otter River, Anticosti.

**Camarotoechia(?) coalescens** Whiteaves.

Camarotoechia(?) coalescens Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 272, pl. 25, fig. 7.

Niagaran: Winisk River, Canada.

**Camarotoechia? concinna** Savage.

Camarotoechia? concinna Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 81, pl. 5, figs. 4, 5.

Upper Medinan (Edgewood): Pike County, Missouri, and near Thebes, Illinois.

**Camarotoechia congruens** Foerste.

Camarotoechia congruens Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 11, pl. 2, fig. 3A, B.

Clinton (Crab Orchard and West Union): Near Martins, etc., Lewis County, Kentucky.

**Camarotoechia decomplicata** (Sowerby).

Terebratula decomplicata Sowerby, Sil. Syst., 1839, pl. 21, fig. 17.

Rhynchonella decomplicata Davidson, Mon. Brit. Foss. Brach., 3, pt. 7, 1871, p. 177, pl. 23, figs. 20-24.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 320, pl. 6, figs. 23, 24.

**Camarotoechia decemplicata**—Continued.

Rhynchonella Eva Billings, Cat. Sil. Foss. Anticosti, 1866, p. 44.

Anabaia anticostiana Clarke, Archiv. Mus. Nac. Rio de Janeiro, 10, 1899, Eng. ed., p. 15, pl. 1, figs. 26-28.

Camarotoechia decemplicata Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 28.

Silurian: England; Cumberland Gap, Tennessee (Clinton); Anticosti (Gun River).

**Camarotoechia ekwanensis** Whiteaves.

Camarotoechia Ekwanensis Whiteaves, Ann. Rep. Geol. Surv. Canada, n. s., 14, App. F, 1904, p. 42; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 252, pl. 25, figs. 4, 4b.

Niagaran: Ekwan River, and Southampton Island, Canada.

**Camarotoechia? festinata** Savage.

Camarotoechia? festinata Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 50, pl. 1, figs. 24-26.

Upper Medinan (Girardeau): Thebes, Illinois.

**Camarotoechia fringilla** (Billings).

Rhynchonella fringilla Billings, Pal. Foss., 1, 1865 (adv. sheets, 1862), p. 141, fig. 118.

Camarotoechia fringilla Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190, pl. 56, figs. 28-30.

Anticostian (Gun River): Gull Cape, Anticosti.

**Camarotoechia gigantea** Maynard.

Camarotoechia gigantea Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 354, pl. 63, figs. 15, 16.

Helderbergian (Keyser): Devils Backbone, near Cumberland and Cash Valley, Maryland.

**Camarotoechia glacialis** (Billings).

Rhynchonella glacialis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 143, fig. 120 (adv. sheets, 1862).

Camarotoechia glacialis Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.

Anticostian (Gun River and Jupiter River): Gull Cape, etc., Anticosti.

**Camarotoechia hudsonica** Grabau.

Camarotoechia hudsonica Grabau, Bull. New York State Mus., 69, 1903, p. 1048, fig. 8; 92, 1906, p. 115.

Helderbergian (Decker Ferry—"Manlius"): Becraft Mountain, near Hudson, New York.

**Camarotoechia hydraulica** (Whitfield).

Rhynchonella hydraulica Whitfield, Ann. New York Acad. Sci., 2, 1882, p. 194;

Ibid., 5, 1891, p. 512, pl. 5, fig. 17; Geol. Ohio, 7, 1895, p. 414, pl. 1, fig. 17.—

Sherzer, Geol. Surv. Michigan, 7, pt. 1, 1900, pl. 17, fig. 17.

Camarotoechia hydraulica Grabau, Michigan Geol. Surv., Geol. Ser. 2, 1909, p. 128, pl. 30, fig. 17.

Lower Monroan (Greenfield): Greenfield, Ohio.

**Camarotoechia(?) indianensis** (Hall).

Rhynchonella indianensis Hall, Trans. Albany Inst., 4, 1863, p. 215; 28th Rep.

New York State Mus. Nat. Hist., 1879, p. 163, pl. 26, figs. 12-22; 11th Rep.

State Geol. Indiana, 1882, p. 306, pl. 26, figs. 12-22; pl. 27, figs. 4-6.—

Nettelroth, Kentucky, Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p.

76, pl. 33, figs. 18-20.—Beecher and Clarke, Mem. New York State Mus. 1,

1889, p. 42, pl. 3, figs. 17-28.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4,

1889, p. 890, figs.

**Camarotoechia(?) indianensis**—Continued.

- Camarotoechia(?) indianensis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 166.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 46, pl. 4, figs. 26, 27.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 284, fig. 348.
- Niagaran: Waldron, Indiana; Newsm, Tennessee (Waldron); Louisville, Kentucky (Louisville); Shelby and Rochester, New York (Guelph); Wisconsin (Racine); Osgood, Indiana (Osgood); etc.
- Plesiotype*.—Cat. No. 51330, U.S.N.M. (Nettelroth).

**Camarotoechia lamellata** (Hall).

- Atrypa lamellata* Hall, Pal. New York, 2, 1852, p. 329, pl. 74, fig. 11.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 237, pl. 21, figs. 23–29.
- Rhynchonella lamellata* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 359; Amer. Geol., 31, 1903, p. 167, figs.
- Camarotoechia lamellata* Grabau, Bull. New York State Mus., 92, 1906, p. 109, fig. 13.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 286, fig. 349.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 352, pl. 63, figs. 9, 10.
- Cayugan (Cobleskill): Schoharie, New York.
- Helderbergian: Pinto, Cumberland, and Cash Valley, Maryland (Keyser); New Jersey (Decker Ferry).

**Camarotoechia leightoni** Williams.

- Camarotoechia leightoni* Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 338, pl. 30, figs. 9, 11, 12, 13.
- Silurian (Pembroke): Leighton Cove, Washington County, Maine.
- Cotypes*.—Cat. Nos. 58962, 58963, U.S.N.M.

**Camarotoechia lindenensis** Foerste.

- Camarotoechia lindenensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 98, pl. 1, fig. 13.
- Niagaran (Brownsport): Near Linden, Tennessee.

**Camarotoechia litchfieldensis** (Schuchert).

- Atrypa* sp. Hall, Pal. New York, 2, 1852, p. 330, pl. 74, figs. 11 and 12.
- Rhynchonella(?) litchfieldensis* Schuchert, Amer. Geol., 31, 1903, p. 167, figs.
- Camarotoechia litchfieldensis* Grabau, Bull. New York State Mus., 92, 1906, p. 109, fig. 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 286, fig. 350.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 353, pl. 63, figs. 11–14.
- Rhynchonella agglomerata* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, pp. 234–235, pl. 21, figs. 5–11.
- Cayugan (Cobleskill): Schoharie Valley, New York.
- Helderbergian: Keyser, West Virginia; Maryland (Keyser); New Jersey (Decker Ferry).

**Camarotoechia litchfieldensis angustata** Hortedahl.

- Camarotoechia litchfieldensis angustata* Hortedahl, 2d Arctic Expl. "Fram," 1898–1902, No. 32, 1914, p. 22, pl. 8, fig. 1.
- Helderbergian (Lower beds): Near Borgen, Southwest Ellesmereland, Arctic America.

**Camarotoechia major** Raymond.

- Camarotoechia major* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 369; Ann. Carnegie Mus., 7, 1911, p. 226, pl. 34, figs. 11–14.
- Chazy (Valcour): Cystid Point, Valcour Island, New York.



**Camarotoechia (Stegerhynchus) neglecta (Hall).**

*Atrypa neglecta* Hall, Pal. New York, 2, 1852, p. 70, pl. 23, fig. 4; p. 274, pl. 57, fig. 1.—Billings, Canadian Nat. Geol., 1, 1856, p. 138, pl. 2, figs. 11, 12.

*Rhynchonella neglecta* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.—Billings, Geol. Canada, 1863, p. 315, fig. 325.—Hall, Trans. Albany Inst., 4, 1863, p. 226.—Meek, Pal. Ohio, 1, 1873, p. 179, pl. 15, fig. 3.—Hall and Whitfield, *ibid.* 2, 1875, p. 134, pl. 7, fig. 15.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 162, pl. 26, figs. 1-6; 11th Rep. State Geol. Indiana, 1882, p. 305, pl. 26, figs. 1-6; pl. 27, fig. 3.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 37, pl. 4, figs. 3, 6-8.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 317, pl. 6, fig. 12.

*Rhynchonella (Stenoschisma) neglecta* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 894, figs.

*Rhynchonella neglecta* var. *scobina* Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 277.

*Rhynchonella scobina* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 116.—Foerste, Geol. Ohio, 7, 1895, p. 592.

*Camarotoechia?* *neglecta* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau, Bull. New York State Mus., 45, 1901, p. 193, fig. 107; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 193, fig. 107.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 284, fig. 346.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 45, pl. 4, figs. 28-31.

Niagaran: Reynales Basin, Lockport, etc., New York (Clinton); Hamilton, Ontario; Dayton and Cedarville, Ohio; Hanover Indiana Wisconsin; Arisaig, Nova Scotia; etc.

**Camarotoechia (Stegerhynchus) neglecta cliftonensis Foerste.**

*Rhynchonella (Stegerhynchus) neglecta-cliftonensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 97, pl. 3, figs. 48 A, B, C.

Upper Medinan (Brassfield): Clifton, Tennessee.

**Camarotoechia nutrix (Billings).**

*Rhynchonella nutrix* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 43.

Gamachian (Ellis Bay) and Anticostian (Gun River, Jupiter River): Gamache Bay, etc., Anticosti.

**Camarotoechia obtusiplicata (Hall).**

*Atrypa obtusiplicata* Hall, Pal. New York, 2, 1852, p. 279, pl. 53, fig. 2.

*Rhynchonella obtusiplicata* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.

*Camarotoechia obtusiplicata* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau, Bull. New York State Mus., 45, 1901, p. 193, fig. 106; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 193, fig. 106.

Clinton: Lockport, etc., New York (Rochester); Arisaig, Nova Scotia.

**Camarotoechia orientalis (Billings).**

*Rhynchonella orientalis* Billings, Canadian Nat. Geol., 4, 1859, p. 443, fig. 21; Geol. Canada, 1863, p. 126, fig. 57.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 896, figs.

*Camarotoechia orientalis* Raymond, Ann. Carnegie Mus., 7, 1911, p. 223, pl. 33, figs. 19-22, 24, 33.

Chazy: Mingan Islands (Mingan), St. Martin Junction, near Montreal and Aylmer, Canada (Aylmer).

**Camarotoechia pisa** (Hall and Whitfield).

*Rhynchonella pisa* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 135, pl. 7, figs. 18-22.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 78, pl. 32, figs. 24-27.—Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 2, p. 63.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 897, figs.

*Camarotoechia pisa*? Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 12, pl. 2, figs. 1A, B.

Niagaran: Highland County, Ohio; Louisville, Kentucky; Ontario (Guelph); etc.

*Plesiotype*: Cat. No. 51325, U.S.N.M. (Nettelroth).

**Camarotoechia plena** (Hall).

*Atrypa plena* Hall, Pal. New York, 1, 1847, p. 21, pl. 4 bis, fig. 7.—Billings, Canadian Nat. Geol., 1, 1856, p. 208, figs. 17-19.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 817, fig. 592.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 191, pl. 3, fig. 28.

*Rhynchonella plena* Hitchcock, Geol. Vermont, 1, 1862, p. 278.—Chapman, Canadian Jour., n. s., 7, 1862, p. 114, fig. 103; 8, 1863, p. 195, fig. 164; Expos. Min. Geol. Canada, 1864, p. 117, fig. 103; p. 167, fig. 164.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 897, figs.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, pp. 65-66.—Billings, Canadian Nat. Geol., 4, 1859, p. 444, fig. 22; Geol. Canada, 1863, p. 126, fig. 50.

*Camarotoechia plena* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 284, fig. 345.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 221, pl. 33, figs. 7-18.

*Atrypa plicifera* Hall, Pal. New York, 1, 1847, p. 22, pl. 4 bis, fig. 8.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 191, pl. 3, fig. 29.

*Rhynchonella plicifera* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 898, fig.

*Atrypa altilis* Hall, Pal. New York, 1, 1847, p. 23, pl. 4 bis, fig. 9.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 192, pl. 3, fig. 30.

*Rhynchonella altilis* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 883.—Hitchcock, Geol. Vermont, 1, 1861, p. 277, fig. 176.

Chazy: Chazy, etc., New York; South Hero, Vermont (Valcour); Ottawa Valley, Canada (Aylmer).

**Camarotoechia pristina** Raymond.

*Camarotoechia pristina* Raymond, Amer. Jour. Sci., 20, 1905, p. 368; Ann. Carnegie Mus., 7, 1911, p. 225, pl. 24, figs. 1-10.

Chazy (Crown Point, Valcour): Valcour Island and Chazy, New York.

**Camarotoechia pyrrha** (Billings).

*Rhynchonella pyrrha* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 44.

Anticostian (Gun River): East of Otter River, Anticosti.

**Camarotoechia semiplicata** (Conrad).

*Atrypa semiplicata* Conrad, 5th Ann. Rep. Geol. Surv. New York, 1841, p. 56.

*Rhynchonella semiplicata* Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 65, figs. 1, 2; Pal. New York, 3, 1859, p. 224, pl. 29, figs. 1a-o.

*Camarotoechia semiplicata* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 129, pl. 16, figs. 13, 14; pl. 20, fig. 12.

Helderbergian (Coeymans): Schoharie and Carlisle, New York.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.



**Camarotoechia semiplicata angulata** Grabau.

*Camarotoechia semiplicata* var. *angulata* Grabau, Bull. New York State Mus., 92, 1906, p. 118, fig. 27.

Helderbergian (Keyser—"Transition beds between Rondout and Manlius"): Schoharie Valley, New York.

**Camarotoechia vicina** (Billings).

*Rhynchonella vicina* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 44.

Anticostian (Chicotte): Southwest Point, Anticosti.

**Camarotoechia (Stegerhynchus) whitii** (Hall).

*Rhynchonella whitii* Hall (not A. Winchell), Trans. Albany Inst., 4, 1863, p. 216; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 164, pl. 26, figs. 23-33; 11th Rep. State Geol. Indiana, 1882, p. 307, pl. 26, figs. 23-33.—

Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 39, pl. 4, figs. 1, 2, 4, 5.

*Rhynchonella whitiana* Miller, Amer. Pal. Fossils, 2d ed., 1883, p. 297.

*Camarotoechia? whitii* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.

Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 285, fig. 348.

Niagaran (Waldron): Waldron, etc., Indiana; Newsom, Tennessee,

**Camarotoechia (Stegerhynchus) whitii præcursor** (Foerste).

*Rhynchonella (Stegerhynchus) whitii-præcursor* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 96, pl. 3, figs. 47A-C.

Upper Medinan (Brassfield): Clifton, Tennessee.

**Camarotoechia winiskensis** Whiteaves.

*Camarotoechia(?) winiskensis* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 272, pl. 25, figs. 5, 6.

Niagaran: Winisk River, Canada.

**CAMEROCERAS** Conrad.

Genotype: *C. trentonensis* Conrad.

*Cameroceras* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 267.—Hall,

Pal. New York, 1, 1847, p. 221, p. 198.—D'Orbigny, Prodr. de Pal., 1, 1849,

p. 4.—Saemann, Palaeontographica, 3, 1852, p. 162.—Pictet, Traité Pal., 2d

ed., 2, 1854, p. 642.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Salter,

Quart. Jour. Geol. Soc. London, 15, 1859, p. 376, fig. 2.—Barrande, Syst. Sil.

Centre Boheme, 2, pt. 3, 1874, p. 782.—Whitfield, Geol. Wisconsin, 4, 1882,

p. 228.—Miller, N. A. Geol. Pal., 1889, p. 432.—Clarke, Geol. Minn., 3, pt. 2,

1897, p. 775.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 404.—

Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 39.

*Sannionites* Waldheim, Oryctographie Gouv. de Moscou, 1837, p. 125.—Barrande,

Syst. Sil. Centre Boheme, 2, pt. 3, 1874, p. 769.—Hyatt, Proc. Boston Soc.

Nat. Hist., 22, 1883, p. 266.

*Proterocameroceras* Ruedemann, Bull. New York State Mus., 80, 1905, pp. 322,

325. (Genotype: *Orthoceras brainerdi* Whitfield.)

*Suecoceras* Holm, Sveriges Geol. Unders., ser. C, No. 163, 1896, p. 11; Geol.

Foren. Stockholm Forhandl., 18, 1896, p. 402.

**Cameroceras approximatum** (Hall).

*Endoceras approximatum* Hall, Pal. New York, 1, 1847, p. 219, pl. 54, fig. 2a.—

Barrande, Bull. Soc. Geol. France, 2d ser., 1855, p. 166; Neues Jahrb. f. Min.,

etc., 1855, p. 267.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 131.—

James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 244.

*Cameroceras approximatum* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist.,

11, pt. 1, 1898, p. 58.

Trenton: Middleville, New York.



**Cameroceras brainerdi** (Whitfield).

*Orthoceras brainerdi* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 319, pl. 27, figs. 14-16.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 56, fig. 5.

*Orthoceras explorator* Whitfield (not Billings), Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 33, pl. 2, fig. 3.

*Cameroceras* (*Proterocameroceras*) *brainerdi* Ruedemann, Bull. New York State Mus., 80, 1905, pp. 296-339, figs. 5-18, pls. 6-9; Bull. 90, 1906, p. 405, pl. 1, figs. 5, 6; pl. 2, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 39, fig. 1234.

Canadian (Beekmantown): Fort Cassin, Vermont; Valcour, New York.

**Cameroceras curvatum** Ruedemann.

*Cameroceras curvatum* Ruedemann, Bull. New York State Mus., 90, 1906, p. 411, fig. 2, pl. 2, figs. 6, 7.

Chazy (Valcour): Isle La Motte, Vermont; Valcour and Chazy, New York.

**Cameroceras duplicatum** (Hall).

*Endoceras duplicatum* Hall, Pal. New York, 1, 1847, p. 219, pl. 55, fig. 1.

*Cameroceras duplicatum* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580.

Trenton: Middleville, New York.

**Cameroceras hennepini** Clarke.

*Cameroceras hennepini* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 779, pl. 52, figs. 1-3; pl. 53, figs. 1-3.

*Endoceras hennepini* Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.).

Trenton (Prosser): Two miles northeast of Spring Valley, Minnesota.

**Cameroceras inaequabile** (Miller).

*Endoceras inaequabile* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 86, pl. 4, figs. 3, 3a.

*Suecoceras inaequabile* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 73, pl. 1, figs. 1, 2.

Richmond: Bristol, Illinois; Clarksville, Ohio; and Madison, Indiana (Waynesville).

**Cameroceras lativentrum** (Hall).

*Endoceras lativentrum* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 181, pl. 5, fig. 1a, b (doc. ed., p. 173).

*Cameroceras lativentrum* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580 (gen. ref.).

Trenton: Near Lowville, New York.

**Cameroceras marcoui** (Barrande).

*Endoceras marcoui* Barrande, Syst. Sil. Centre Boheme, 2, 1874, p. 748, pl. 431, figs. 11-13.

*Suecoceras marcoui* Holm, Geol. Fören. Stockholm Förh., 18, 1896, pp. 403, 414.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 425, figs. 9-11.

Canadian (Beekmantown): Phillipsburg, Quebec.

**CAMEROCERAS PROTEIFORME** Clarke. See *Endoceras proteiforme*.

**CAMEROCERAS PROTEIFORME** var. **ELONGATUM** Clarke and Ruedemann. See *Endoceras proteiforme elongatum*.

**Cameroceras tenuiseptum** (Hall).

*Orthoceras tenuiseptum* Hall, Pal. New York, 1, 1847, p. 35, pl. 7, fig. 6.—Raymond, Amer. Pal. Bull. 5, 1, No. 14, 1902, p. 19.

**Cameroceras tenuiseptum**—Continued.

*Cameroceras tenuiseptum* Ruedemann, Bull. New York State Mus., 90, 1906, p. 408, pl. 3, figs. 1, 2; pl. 4, fig. 1; pl. 5, figs. 5, 6; pl. 6, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 40, fig. 1235.

Chazy (Day Point—Valcour): Near Chazy and Valcour Island, New York; Isle La Motte, Vermont.

**Cameroceras trentonense** Conrad.

*Cameroceras Trentonensis* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 267, pl. 16, fig. 3.—Owen (Emmons), Amer. Jour. Sci. and Arts, 47, 1844, p. 369, fig. 4.—Hall, Pal. New York, 1, 1847, p. 221, pl. 56, figs. 4a-c.—Verneuil and Marcou, Amer. Jour. Sci. and Arts, 2d ser., 17, 1854, p. 292.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 266; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 165.

Trenton: Middleville, New York.

**Cameroceras velox** (Billings).

*Orthoceras velox* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 173.

*Cameroceras velox* Ruedemann, Bull. New York State Mus., 90, 1906, p. 410.

Chazy: Mingan Island (Mingan), and Islands of Montreal and Bizard, Canada (Aylmer).

**CAMPANULITES** Troost. See *Cleioocrinus* Billings.

**CAMPTOLITHUS** Lindström. See *Lyellia* Edwards and Haime.

**CANADOCYSTIS** Jaekel.

Genotype: *Malocystites barrandi* Billings.

*Canadocystis* Jaekel, Zeits. d. d. geol. Gesell., 52, 1900, p. 675.

*Sigmacystis* Hudson, Bull. New York State Mus., 149, 1911, p. 254. (Genotype: *Malocystites emmonsi* Hudson.)

**Canadocystis barrandi** (Billings).

*Malocystites Barrandi* Billings, Geol. Surv. Canada, dec. 3, 1858, pp. 67, 68, figs. 1, 2; pl. 7, figs. 2a-d.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 471.

*Canadocystis Barrandei* Jaekel, Zeit. d. d. geol. Ges., 52, 1900, pp. 675, 676, fig. 11. *Sigmacystis barrandi* Hudson, Bull. New York State Mus., 149, 1911, p. 253 (gen. ref.).

Chazy (Aylmer): Montreal, Quebec.

**Canadocystis emmonsi** (Hudson).

*Malocystites emmonsi* Hudson, Bull. New York State Mus., 80, 1905, pp. 270-277, figs. 1-3; pl. 1, figs. 3-7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 471, fig. 1783.

*Sigmacystis emmonsi* Hudson, Bull. New York State Mus., 149, 1911, p. 253, figs. 35, 36.

Chazy (Crown Point, Valcour): Valcour Island, etc., New York.

**CANCER TRILOBIODES** Eaton. See *Triarthrus becki*.

**CANINIA** Dana. See *Zaphrentis Rafinesque*.

**CANISTROCRINUS** Miller. See *Glyptocrinus* Hall.

**CANNAPORA** Hall.

Genotype: *C. junciformis* Hall.

*Cannapora* Hall, Pal. New York, 2, 1852, p. 43.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 86.—Roemer, Lethæa geog., pt. 1, Leth. Pal., 1883, p. 498.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 62.



*CANNAPORA ANNULATA* Nicholson and Hinde. See *Cannapora junciformis*.

***Cannapora junciformis* Hall.**

*Cannapora junciformis* Hall, Pal. New York, 2, 1852, p. 43, pl. 18, figs. 1a-f.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 86, pl. 33, fig. 4.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 63.

*Cannapora annulata* Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 138.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 58.

Niagaran: Ontario, Wayne County, and Rochester, New York (Clinton); Drummond Island, Lake Huron.

**CAPELLINIA Hall and Clarke.**

Genotype: *C. mira* Hall and Clarke.

*Capellinia* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 248, pl. 70, figs. 6-14; 13th Ann. Rep. New York State Geol., 1895, p. 847.—Miller, N. A. Geol. Pal., 2d. App., 1897, p. 759.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 395.

***Capellinia mira* Hall and Clarke.**

*Capellinia mira* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 249, pl. 70, figs. 6-14; 48th Rep. New York State Mus., 2, 1895, p. 368, pl. 13, figs. 5-13; 14th Rep. State Geol. New York, 1897, p. 368, pl. 13, figs. 5-13.

Niagaran (Racine): Milwaukee, Wisconsin.

**CAPULUS AURIFORMIS** Hall. See *Diaphorostoma auriformis*.

**CAPULUS CANADENSIS** Whiteaves. See *Archinacella canadensis*.

**CARABOCRINUS Billings.**

Genotype: *C. radiatus* Billings.

*Carabocrinus* Billings, Geol. Surv. Canada, Rep. Prog. for 1853-1856, 1857, p. 275; Geol. Surv. Canada, dec. 4, 1859, p. 30, fig. 12.—Zittel, Handb. Pal., 1, Munich, 1879, p. 353.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 366 (Rev. Pal. pt. 1, p. 143); Ibid., 1886, p. 140; ibid., 1890, p. 380.—Billings, Trans. Ottawa Field Nat. Club, 1, 2, 1881, p. 34.—Miller, N. A. Geol. Pal., 1889, p. 230.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 13; Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 172, fig. 84.—Zittel, Grundzuge Pal., 1, 1910, p. 152.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504.—Springer, Zittel-Eastman Textb. Pal., 1913, p. 217.

*Strophocrinus Sardeson*, Amer. Geol., 24, 1889, p. 264. (Genotype: *S. dicyclis* Sardeson.)

***Carabocrinus dicyclis* (Sardeson).**

*Strophocrinus dicyclis* Sardeson, Amer. Geol., 24, 1889, p. 264, pl. 12.

*Podolithus strophocrinus* Sardeson, Jour. Geol., 14, 1908, p. 242, figs. 8-10.

Black River (Decorah): St. Paul, Minnesota; Ellsworth, Wisconsin.

***Carabocrinus geometricus* Hudson.**

*Carabocrinus geometricus* Hudson, Bull. New York State Mus., 80, 1905, p. 282, pl. 1, figs. 1, 2, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504, fig. 1816.

Chazyan (Valcour): Valcour Island, Lake Champlain, New York.

***Carabocrinus ovalis* Miller and Gurley.**

*Carabocrinus ovalis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 25, pl. 2, figs. 20, 21.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1323.

Trenton (Curdsville): Mercer County, Kentucky.



**Carabocrinus radiatus** Billings.

*Carabocrinus radiatus* Billings, Geol. Surv. Canada, Rep. Prog. for 1853-1856, 1857, p. 276; Geol. Surv. Canada, dec. 4, Can. Org. Rem., 1859, p. 31, pl. 2, figs. 3a-e.—Miller, N. A. Geol. Pal., 1889, p. 230, fig. 261.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504, fig. 1817.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 40 (loc. occ.).

*Carabocrinus* cf. *radiatus* Ruedemann, Bull. New York State Mus., 162, 1912, pl. 3, fig. 6.

Trenton: Ottawa and Kirkfield, Ontario (Curdsville); Snake Hill, Saratoga County, New York (Snake Hill).

**Carabocrinus(?) tuberculatus** Billings.

*Carabocrinus(?) tuberculatus* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 33, pl. 10, fig. 2a-c.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 9 (loc. ref.).

Richmond (Charleton): Charleton Point, Anticosti.

**Carabocrinus vancortlandti** Billings.

*Carabocrinus vancortlandti* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 32, pl. 2, fig. 4.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1900, p. 28, fig. 9.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 40.

Trenton (Curdsville): Township of McNab, and Kirkfield, Ontario.

**CARCINOSOMA** Miller. See *Eusarcus* Grote and Pitt.

**CARCINOSOMA INGENS** Claypole. See *Eusarcus newlini*.

**CARCINOSOMA NEWLINI** Claypole. See *Eusarcus newlini*.

**CARDIODONTA** Hall. See *Stropheodonta* Hall.

**CARDIOMORPHA OBLIQUATA** Meek. See *Ceromyopsis obliquata*.

**CARDIOMORPHA POSTRIATA** Emmons. See *Lyrodesma postriata*.

**CARDIOMORPHA VENTRICOSA** Emmons. See *Whitella ventricosa*.

**CARDIOMORPHA VETUSTA** Hall. See *Cuneamya vetusta* Hall.

**CARDIUM IOWENSIS** Owen. See *Cypricardites iowensis*.

**CARINAROPSIS** Hall.

Genotype: *C. carinata* Hall.

*Carinaropsis* Hall, Pal. New York, 1, 1847, p. 183; 14th Rep. New York State Cab. Nat. Hist., 1861, p. 93.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 314; N. A. Geol. Pal., 1889, p. 400.—Koken, Bull. d. l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 139.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 857-926.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 626.

*Phragmostoma* Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 94.—Zittel, Handb. Pal., 2, 1882, p. 184.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, p. 388.—Miller, N. A. Geol. Pal., 1889, p. 415.—Koken, Die Leitfossilien, Leipzig, 1896, p. 99.—Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 42 footnote; Mem. New York State Mus., 6, 1904, p. 322 (Genotype: *Carinaropsis cymbula* Hall).

**Carinaropsis acuta** Ulrich and Scofield.

*Carinaropsis acuta* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 928, pl. 62, figs. 6-9.

Black River (Decorah): Cannon Falls and near Fountain, Minnesota; Lincoln County, Missouri.

*Cotypes*.—Cat. Nos. 45736, 45737, U.S.N.M.

**Carinaropsis carinata** Hall.

*Carinaropsis carinata* Hall, Pal. New York, 1, 1847, p. 183, pl. 40, figs. 1a-c.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 30.

*Cyrtolites subcarinatus* D'Orbigny, Prodr. Pal., 1, 1849, p. 9.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 167, pl. 6, figs. 25, 26.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 183, figs.

*Carinaropsis?* *subcarinata* Ulrich and Scofield, Geol. Minnesota, 3, 1897, p. 859 (gen. ref.).

Trenton: Middleville and Trenton Falls, New York.

**Carinaropsis cunulæ** (Hall).

*Carinaropsis* (*Phragmostoma*) *cunulæ* Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 95.

*Phragmostoma cunulæ* Miller, N. A. Geol. Pal., 1889, p. 415 (gen. ref.).

*Carinaropsis cunulæ* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 927, pl. 62, figs. 10-13.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 626, fig. 845a-c.

Trenton: Nashville, Tennessee (Catheys); Boyle County, Kentucky (Flanagan). *Plesiotypes*.—Cat. No. 45738, U.S.N.M.

**Carinaropsis cymbula** (Hall).

*Carinaropsis* (*Phragmostoma*) *cymbula* Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 94.

*Carinaropsis cymbula* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 927, pl. 62, figs. 1-4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 626, fig. 845d-g.

*Phragmostoma natator* (in error for *cymbula*) Hall, 15th Rep. New York State Cab. Nat. Hist., 1862, pl. 6, figs. 12-14.

*Phragmostoma cymbula* Miller, N. A. Geol. Pal., 1889, p. 415, fig. 693.

Trenton: Allens Bluff, Tennessee (Catheys); Danville, Kentucky (Flanagan). *Plesiotypes*.—Cat. No. 45739, U.S.N.M.

**CARINAROPSIS DELETA** Sardeson. See *Archinacella deleta*.

**Carinaropsis explanata** Ulrich.

*Carinaropsis explanata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 929, pl. 62, fig. 5. Trenton (Upper): Covington, Kentucky.

*Holotype*.—Cat. No. 45740, U.S.N.M.

**Carinaropsis minima** Ulrich and Scofield.

*Carinaropsis minima* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 929, pl. 62, fig. 19.

Black River (Decorah): Near Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 45741, U.S.N.M.

**CARINAROPSIS ORBICULATUS** Hall. See *Archinacella orbiculata*.

**CARINAROPSIS PATELLIFORMIS** Hall. See *Archinacella patelliformis* and *A. pulaskiensis*.

**Carinaropsis phalera** (Sardeson).

*Carinaropsis* (or *Bellerophon*) *phalera* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 336, pl. 6, figs. 14-16.

*Carinaropsis phalera* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 928, pl. 62, figs. 14-18.

Black River (Decorah): St. Paul, Minneapolis, and Chatfield, Minnesota; Lincoln County, Missouri.

*Plesiotypes*.—Cat. Nos. 45742, 45743, U.S.N.M.



**CARINAROPSIS?** *SUBCARINATA* Ulrich and Scofield. See *Carinaropsis carinata*.

**CARINOPORA** Zittel. See *Semicoscinium* Prout.

**CARITODENS** Foerste. See *Pterinea* Goldfuss.

**CARPOMANON** Rauff. Genotype: *Spongia stellatimsulcatum* Roemer.  
*Carpomanon* Rauff, *Palæontographica*, 40, 1894, p. 314.

**Carpomanon glandulosum** Rauff.

*Carpomanon glandulosum* Rauff, *Palæontographica*, 40, 1894, p. 326, pl. 13, figs. 11, 12.

Niagaran (Brownsport): Decatur County, Tennessee.

**Carpomanon stellatimsulcatum** (Roemer).

*Spongia stellatim-sulcata* Roemer, *Neues Jahrb. f. Min., etc.*, 1848, p. 686, pl. 9, fig. 5.

*Astylospongia stellatim-sulcata* Roemer, *Sil. Fauna West Tennessee*, 1860, p. 11, pl. 1, figs. 2, 2a, 2b; *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 190; *Leth. geog.*, 1 Theil, *Leth. Pal.*, *Erste Lief.*, 1880, p. 309.

*Carpomanon stellatim-sulcatum* Rauff, *Palæontographica*, 40, 1894, p. 325, pl. 12, figs. 4-13.

*Caryomanon stellatim-sulcatum* Foerste, *Jour. Geol.*, 11, 1903, p. 714.

Niagaran (Brownsport): Brownsport, Perryville, etc., Tennessee.

*Plesiotypes*.—Cat. Nos. 46578, 49711, U.S.N.M.

**Carpomanon stellatimsulcatum distorta** Rauff.

*Carpomanon stellatim-sulcatum* var. *distorta* Rauff, *Palæontographica*, 40, 1894, p. 324, pl. 13, figs. 9, 10.

Niagaran (Brownsport): Decatur County, Tennessee.

**CARYOCARIS** Salter.

Genotype: *C. wrighti* Salter.

*Caryocaris* Salter, *Quart. Jour. Geol. Soc. London*, 19, 1863, pp. 135, 139, fig. 15.—Jones, *Rep. 53d Meeting Brit. Assoc. Adv. Sci.*, 1884, pp. 217, 221.—Zittel, *Handb. Pal.*, 2, 1885, p. 659.—Jones and Woodward, *Mon. Brit. Pal. Phyllopoda*, *Pal. Soc.*, 1888, p. 3; *ibid.*, 1892, p. 89.—Whitfield, *Geol. Surv. Ohio*, *Pal.*, 7, 1893, p. 455.—Gurley, *Jour. Geol.*, 4, 1896, p. 85.—Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, *Addendum*, 1904, pp. 735-736.—Clarke, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 751.

**Caryocaris curvillatus** Gurley.

*Caryocaris curvillatus* Gurley, *Jour., Geol.*, 4, 1896, p. 87, pl. 4, fig. 3; pl. 5, fig. 3.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, p. 486, figs. 469, 470.

*Caryocaris* cf. *curvilineatus* Ruedemann, *Mem. New York State Mus.*, 7, 1904, p. 738, pl. 17, fig. 17.

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec; Summit Nevada.

**Caryocaris oblongus** Gurley.

*Caryocaris oblongus* Gurley, *Jour. Geol.*, 4, 1896, p. 87, pl. 4, fig. 2.

*Caryocaris* cf. *oblongus* Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, p. 738, fig. 104; pl. 17, figs. 14-16.

Canadian (Levis): Point Levis, Quebec.

**Caryocaris wrighti** Salter.

*Caryocaris wrighti* Salter, *Quart. Jour. Geol. Soc. London*, 19, 1863, p. 139, fig. 15.—Jones and Woodward, *Mon. Brit. Phyllopoda*, pt. 2, 1892, p. 91, fig. 6.—Gurley, *Jour. Geol.*, 4, 1896, p. 87.—Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, pp. 736, 737, fig. 103; *Mem.* 11, pt. 2, 1908, pp. 486-488, fig. 482.

Lower Ordovician: Great Britain (Skiddaw); Nevada, Arkansas, etc. (Canadian).



**CARYOCRINITES** Say.Genotype: *C. ornatus* Say.

*Caryocrinites* Say, Jour. Acad. Nat. Sci. Philadelphia, 4, 1825, p. 289; Zool. Jour., London, 2, Oct., 1825, p. 311.—Von Buch, Quart. Jour. Geol. Soc. London, 2, 1846, p. 23.—Say (reprint), Bull. Amer. Pal., 1, 1876, p. 347.—Jaekel, Stamm. Pelm., 1, Thecoidea and Cystoidea, 1879, p. 313.—Zittel, Grundzuge Pal., 1, 1910, p. 186.

*Caryocrinus* Agassiz, Ann. Nat. Hist., 1, 1838, p. 448.—Austin and Austin, Mon. Recent and Fossil Crin., 1845, p. 53, fig.—D'Orbigny, Prodr. Pal., 1, 1847, p. 47.—Hall, Pal. New York, 2, 1852, pp. 216, 248.—Muller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 247.—Pictet, Traite de Pal., 2d ed, 4, 1857, p. 300.—Billings, Amer. Jour. Sci. and Arts, 2d ser., 48, 1869, p. 72; 49, 1870, p. 53; Ann. Mag. Nat. Hist., 4th ser., 5, 1870, pp. 254, 411; Amer. Jour. Sci., 3d ser., 7, 1874, p. 530.—Zittel, Handb. Pal., 1, 1879, p. 418.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1887, pp. 100–113.—Miller, N. A. Geol. Pal., 1889, p. 231.—Carpenter, Rep. 60th Meeting British Assoc. Adv. Sci., 1891, p. 221.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 143, pl. 4, figs. 2L, 21.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 67, fig. 36.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 149; Bull. New York State Mus., 45, 1901, p. 149.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 464.—Springer, Zittel-Eastman Textb. Pal. 1, 1913, p. 153.

**Caryocrinites bulbulus** (Miller and Gurley).

*Caryocrinus bulbulus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 11, pl. 2, figs. 15–18.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1324.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 465.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 11, pl. 2, fig. 2.

*Caryocrinites hexagonus* Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Caryocrinus hexagonus* Shumard, Trans. Acad. Nat. Sci. St. Louis, 2, 1866, p. 359 (gen. ref.).

Niagaran (Brownsport): Wayne and Decatur Counties, Tennessee.

*Plesiotype*.—Cat. No. 39906, U.S.N.M. (Troost's type of *C. hexagonus*).

**Caryocrinites ellipticus** (Miller and Gurley).

*Caryocrinus ellipticus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 10, pl. 2, figs. 13, 14.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1325.

Clinton (Osgood): Osgood, Indiana.

**Caryocrinites globosus** (Troost).

*Caryocrinites globosus* Troost, Amer. Jour. Sci. and Arts, 2d. ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 2, 1850 (nom. nud.).

*Caryocrinus globosus* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 351.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 11, pl. 2, fig. 1.

Niagaran (Brownsport): Decatur County, Tennessee.

*Holotype*.—Cat. No. 39907, U.S.N.M.

**CARYOCRINITES GRANULATUS** Troost. See *Caryocrinites milliganæ*.

**Caryocrinites hammelli** (Miller and Gurley).

*Caryocrinus hammelli* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 9, 1896, p. 65, pl. 5, figs. 5, 6.

Clinton (Osgood): Madison County, Indiana.

**CARYOCRINITES HEXAGONUS** Troost. See *Caryocrinites bulbulus*.

**Caryocrinites indianensis** (Miller).

*Caryocrinus indianensis* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 629, pl. 5, figs. 9, 10 (adv. sheets 1891, p. 19); N. A. Geol. Pal., 1st App., 1892, p. 676, fig. 1218.

Clinton (Osgood): Jefferson County, Indiana.

**CARYOCRINITES INSCULPTUS** Troost. See *Caryocrinites milliganæ*.

**Caryocrinites kentuckiensis** (Miller and Gurley).

*Caryocrinus kentuckiensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 59, pl. 5, figs. 22-24.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1320.

Niagaran (Louisville): Louisville, Kentucky.

**CARYOCRINITES LORICATUS** Say. See *Caryocrinites ornatus*.

**CARYOCRINITES MECONIDEUS** Troost. See *Caryocrinites milliganæ*.

**Caryocrinites milliganæ** (Miller and Gurley).

*Caryocrinus milliganæ* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 9, 1896, p. 63, pl. 5, figs. 3, 4.

*Caryocrinites granulatus* Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Caryocrinites meconideus* Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Caryocrinites insculptus* Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Caryocrinites Roemeri* Jaekel, Stammes. Pelmat., Thecoidea u. Cystoidea, 1899, p. 314, pl. 17, fig. 3; p. 302, fig. 70.

*Caryocrinus ornatus* Roemer, Sil. Fauna West Tennessee, 1860, p. 33, pl. 3, figs. 1a-c.

Niagaran (Brownsport): Decatur County, Tennessee.

*Plesiotypes*.—Cat. Nos. 39904, 39905, U.S.N.M. (Troost's types of *C. insculptus* and *C. granulatus*).

**Caryocrinites ornatus** Say.

*Caryocrinites ornatus* Say, Jour. Acad. Nat. Sci. Philadelphia, 4, 1825, p. 290; Zool. Jour., London, 2, 1825, p. 311, pl. 11, fig. 1.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 51, pl. 25, fig. 2.—Buch, Bull. Soc. Geol. France, 2d ser., 1, 1844, p. 209, pl. 3, figs. 7-9, 11-15.—Say, Bull. Amer. Pal., 1, 1896, p. 348.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, 1899, p. 314, figs. 76, 77, pl. 17, fig. 1.—Von Buch, Abhandl. k. Akad. d. Wiss. for 1844, Berlin, 1846, p. 91, pl. 1, figs. 1-7; pl. 1, figs. 1-2.

*Caryocrinus ornatus* Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 314, figs. 1, 2.—Austin and Austin, Mon. Recent and Fossil Crinoidea, 1845, p. 53, pl. 7, figs. 3a-m.—Von Buch, Quart. Jour. Geol. Soc. London, 2, 1846, p. 11; Geol. Mem., p. 20, pl. 4, fig. 1.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 11, figs. 1, 2, etc.; Pal. New York, 2, 1852, p. 182, pl. A41, fig. 1; p. 216, pl. 49, figs. 1a-z; pl. 49A, figs. 1a-z.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 300, pl. 99, fig. 18.—Emmons, Man. Geol., 1860, p. 110, fig. 100.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, figs. 4, 5.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 91.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 357.—Billings, Canadian Nat., n. s., 4, 1869, p. 280, fig. 2; p. 285, fig. 4; p. 427, fig. 1; Amer. Jour. Sci. and Arts, 2d ser., 48, 1869, p. 72, fig. 3; p. 76, fig. 4; 49, 1870, p. 52, fig. 1.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 11 (2), fig. 17; rev. ed., 1870, pl. 11, fig. 17.—



**Caryocrinites ornatus**—Continued.

- Billings, Ann. Mag. Nat. Hist., 4th ser., 5, 1870, p. 254, fig. 3; p. 258, fig. 4; p. 410, fig. 1; Pal. Foss. Geol. Surv. Canada, 2, pt. 1, 1874, pp. 92, fig. 52; 93; 96; 97; fig. 53; 98; 105; fig. 64; 124.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 4a.—Zittel, Handb. Pal., 1, 1879, p. 419, fig. 295.—Whitfield, Geol. Wisconsin, 4, 1882, p. 280, pl. 16, figs. 1, 2.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1887, p. 113, pl. 4, fig. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 119, figs.—Miller, N. A. Geol. Pal., 1889, p. 231, fig. 262.—Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 144, fig. 23, pl. 4, figs. 20, 21.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 150, fig. 46; Bull. New York State Mus., 45, 1901, p. 150, fig. 46.—Rowley, Amer. Geol., 34, 1904, p. 280, pl. 16, figs. 47, 50, 52.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 465, figs. 1771–1773.
- Caryocrinites loricatus* Say, Jour. Acad. Nat. Sci. Philadelphia, 4, 1825, p. 291; Zool. Jour. London, 2, 1825, p. 312; Bull. Amer. Pal., 1, 1896, p. 349 (reprint).
- Clinton: Lockport, Rochester, etc., New York; Grimsby, etc., Ontario (Irondequoit and Rochester); Osgood, Indiana (Osgood).

**CARYOCRINITES ROEMERI** Jaekel. See *Caryocrinites milliganæ*.

**CARYOCRINUS** of authors. See *Caryocrinites* Say.

**CARYOCRINUS HEXAGONUS** Shumard. See *Caryocrinites bulbulus*.

**CARYOCRINUS ORNATUS** Roemer. See *Caryocrinites milliganæ*.

**CARYOCYSTITES ALTERNATUM** Hall. See *Holocystites alternatus*.

**CARYOCYSTITES CYLINDRICUM** Hall. See *Holocystites cylindricus*.

**CARYOMANON** Rauff.Genotype: *Spongia incisulobata* Roemer.

*Caryomanon* Rauff, Palæontographica, 40, 1894, p. 313.

**Caryomanon incisulobatum** Roemer.

*Spongia incisulobata* Roemer, Neues Jahrb. f. Min., etc., 1848, p. 685, pl. 9, fig. 4.

*Astylospongia incisulobata* Roemer, Sil. Fauna West. Tennessee, 1860, p. 11, pl. 1, figs. 3, 3a; Cincinnati Quar. Jour. Sci., 1, 1874, p. 191.—Hinde, Mon. British Foss. Sponges, Pal. Soc., 1888, p. 114, pl. 2, figs. 5, 5a.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.

*Caryomanon incisulobatum* Rauff, Palæontographica, 40, 1894, p. 325, pl. 14, figs. 7, 8.—Foerste, Jour. Geol., 11, 1903, p. 714.

Niagaran (Brownsport): Brownsport, Perryville, etc. Tennessee.

**Caryomanon patel** Foerste.

*Caryomanon patei* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 107, pl. 1, fig. 15.

Niagaran (Brownsport): Near Martins Mills, Tennessee.

**Caryomanon roemeri** Rauff.

*Caryomanon Roemeri* Rauff, Palæontographica, 40, 1904, p. 323, pl. 14, figs. 4–6.

*Astylospongia Roemeri* Hinde, Cat. Foss. Sponges, 1883, p. 92, pl. 23, figs. 1a–b.

Niagaran (Brownsport): West Tennessee.

**CARYOMANON STELLATIM-SULCATUM** Foerste. See *Carpomanon stellatimsulcatum*.

**CARYOSPONGIA** Rauff.Genotype: *Siphonia juglans* Quenstedt.

*Caryospongia* Rauff, Palæontographica, 40, 1894, p. 296.



**Caryospongia juglans nuxmoschata** (Hall).

*Astylospongia præmorsa* var. *nuxmoschata* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed. 1879, p. 104, pl. 3, figs. 12, 13; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 223, pl. 2, figs. 12, 13.

*Caryospongia juglans* (Quenstedt) var. *nuxmoschata* Rauff, *Palæontographica*, 40, 1894, p. 310, pl. 11, figs. 4-6.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

*Plesiotype*.—Cat. No. 46548, U.S.N.M.

**CASTOCRINUS KENTUCKIENSIS** Miller and Gurley. See *Cremacrinus articulatus*.

**CASTOCRINUS** Ringueberg. See *Cremacrinus* Ulrich.

**CATASCHISMA** Branson.

Genotype: *C. typa* Branson.

*Cataschisma* Branson, Trans. Acad. Sci. St. Louis, 18, 1909, p. 43.

**Cataschisma typa** Branson.

*Cataschisma typa* Branson, Trans. Acad. Sci. St. Louis, 18, 1909, p. 43, pl. 7, fig. 15.

Black River (Auburn-Decorah): Lincoln County, Missouri.

**CATAZYGA** Hall and Clarke.

Genotype: *Athyris headi* Billings.

*Catazyga* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 157, fig. 151; 13th Ann. Rep. New York State Geol. 1895, p. 803.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 333.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 887.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 408.

**CATAZYGA ERRATICA** Hall and Clarke. See *Zygospira erratica*.

**Catazyga headi** (Billings).

*Athyris headi* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 147, fig. 125 (adv. sheets, 1862); Geol. Canada, 1863, p. 212, fig. 214.

*Zygospira headi* Hall, 23d Rep. New York State Cab. Nat. Hist., 1872, pl. 13, figs. 23-25 (ext. 1871).—Davidson, Suppl. Brit. Sil. Brach., Pal. Soc., 1882, pp. 125, 126, fig.

*Glassia headi* Miller, N. A. Geol. Pal., 1889, p. 346.

*Catazyga headi* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 158, fig. 151; pl. 54, figs. 24-26, 30.

Richmond: St. Lawrence River, opposite Three Rivers; near St. Nicholas, St. Croix, and Becancour River, Quebec.

**CATAZYGA HEADI** Cumings. See *Catazyga headi schuchertana*.

**Catazyga headi anticostiensis** (Billings).

*Athyris Headi* var. *Anticostiensis* Billings, Pal. Foss. 1, Geol. Surv. Canada, 1865, p. 147, fig. 127a, b (adv. sheets, 1862).

*Athyris anticostiensis* Billings, Geol. Canada, 1863, p. 212, fig. 215.

*Zygospira anticostiensis* Davidson, Suppl. Brit. Sil. Brach., Pal. Soc., 1882, p. 127, p. 128, figs. 1, 2.

*Catazyga headi* var. *anticostiensis* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 54, figs. 33, 34.

Richmond (English Head and Charleton): English Head, etc., Anticosti.

**Catazyga headi borealis** (Billings).

*Athyris Headi* var. *borealis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 147, fig. 126a, b (adv. sheets, 1862).

*Athyris borealis* Billings, Geol. Canada, 1863, p. 212, fig. 216.

*Catazyga headi borealis* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 54, figs. 31-32.

Richmond: Lake St. John and Anticosti, Canada.

**CATAZYGA HEADI BOREALIS** Hall and Clarke (part). See *Catazyga headi schuchertana*.

***Catazyga headi schuchertana* (Ulrich).**

*Glassia schuchertana* Ulrich, Amer. Geol., 1, 1888, p. 186.

*Zygospira headi* Meek, Pal. Ohio, 1, 1873, p. 127, pl. 11, fig. 1.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 59.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1283, figs.

*Catazyga headi* var. *borealis* Hall and Clarke (part), Pal. New York, 8, pt. 2, 1895, pl. 54, fig. 27.

*Catazyga headi* Cumings, 32 Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 896, pl. 33, figs. 1-1c.

*Catazyga headi schuchertana* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 32, pl. 2, fig. 3; pl. 3, figs. 2a-c, 11.

Richmond (Waynesville): Blanchester, etc., Ohio; Indiana; Kentucky.

***Catazyga uphami* (Winchell and Schuchert).**

*Zygospira uphami* Winchell and Schuchert, Amer. Geol., 9, 1892, p. 291; Geol. Minnesota, 3, 1892, p. 468, pl. 34, figs. 45-48.

*Catazyga uphami* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 170.

Trenton (Prosser): Near Spring Valley, Wykoff, and Fountain, Minnesota.

**CATAZYGA UPHAMI AUSTRALIS** Foerste. See *Protorhyncha ridleyana*.

**CATENIPORA** Lamarck. See *Halysites* Lamarck.

**CATENIPORA ESCHAROIDES** Lamarck. See *Halysites catenularia*.

**CATENIPORA MEANDRINA** Troost. See *Halysites labyrinthica*.

**CATENIPORA MICHELINI** Castelnau. See *Halysites labyrinthica*.

**CAUNOPORA** Phillips.

Genotype: *Coscinopora placenta* Lonsdale.

*Caunopora* Phillips, Pal. Foss. Cornwall, Devon, and West Somerset, 1841, p. 18.—

McCoy, British Pal. Rocks Foss., 1854, p. 66.—Winchell, Proc. Amer. Assoc.

Adv. Sci., 15, 1867, p. 99.—Carter, Ann. Mag. Nat. Hist., 5th ser., 2, 1878, p.

310; 4, 1879, p. 101.—Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878,

pp. 219, 211.—Dawson, Quart. Jour. Geol. Soc. London, 35, 1879, p. 56.—

Zittel, Handb. Pal., 1, 1879, p. 286.—Roemer, Geol. Mag., dec. 2, 7, 1880, p.

343.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 46; Trans. Acad.

Sci. St. Louis, 4, 1884, p. 596.—Frech, Paleont. Abhandl., Dames and

Kayser, 3, Heft 3, 1886, p. 115.—Nicholson, Mon. Brit. Stromatoporoids,

Pal. Soc., 1886, pp. 11, 22, 110.—Miller, N. A. Geol. Pal., 1889, p. 156; Zittel

Eastman Textb. Pal., 2d ed., 1913, p. 123.

***Caunopora hudsonica* Dawson.**

*Caunopora hudsonica* Dawson, Quart. Jour. Geol. Soc. London, 35, 1879, p. 52, pl. 4, fig. 9; pl. 5, fig. 10.

Niagaran: Albany River, Hudson Bay, Canada.

***Caunopora mirabilis* Spencer.**

*Caunopora mirabilis* Spencer, Bull. Mus. Univ. State Missouri, 1, No. 1, 1884, p.

47, pl. 6, figs. 10, 10a-b; Trans. Acad. Sci. St. Louis, 4, 1884, p. 597, pl. 6,

figs. 10-10b.—Whiteaves, Canadian Rec. Sci., 7, 1896, p. 145.—Parks, Univ.

Toronto Studies (Geol. Ser.), 5, 1908, p. 65.

Niagaran dolomite: Hamilton, Ontario.

**CAUNOPORA WALKERI** Spencer. See *Protarea walkeri*.

**CENTROCRINUS TENNESSEENSIS** Worthen. See *Ormocrinus tennesseensis*.



**CENTRONELLA** Billings.Genotype: *Rhynchonella glansfagea* Hall.

*Centronella* Billings, Canadian Nat. Geol., 4, 1859, p. 131, figs. 1-5; Canadian Jour., 6, 1861, p. 271.—Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 45, figs. 13-17; Amer. Jour. Sci., 2d ser., 35, 1863, p. 396.—Billings, *ibid.*, 36, 1863, p. 237.—Hall, Trans. Albany Inst., 4, 1863, pp. 134, 148. Winchell, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 122.—Hall, Pal. New York, 4, 1867, p. 399.—Hall and Clarke, *ibid.*, 8, pt. 2, 1893, p. 265; 13th Ann. Rep. New York State Geol., 1895, p. 853.

**CENTRONELLA BILLINGSIANA** Meek and Worthen. See *Whitfieldella? billingsana*.

**Centronella? buplicata** Weller.

*Centronella? buplicata* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 261, pl. 24, figs. 1-8.

Helderbergian (Keyser—"Manlius"): Nearpass quarry, two miles south of Tri-States, New York.

**CERAMOPHYLLA** Ulrich.Genotype: *Ceramophylla frondosa* Ulrich.

*Ceramophylla* Ulrich, Geol. Minnesota, 3, 1893, p. 331.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123.—Bassler, Zittel-Eastman Textb., Pal. 1913, p. 328.

**Ceramophylla frondosa** Ulrich.

*Ceramophylla frondosa* Ulrich, Geol. Minnesota, 3, 1893, p. 331, pl. 28, figs. 3-7; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268, fig. 438.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123, fig. 182b.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 466.

Black River (Decorah): St. Paul and Goodhue County, Minnesota.

*Cotypes*.—Cat. No. 43279, U.S.N.M.

**CERAMOPORA** Hall.Genotype: *C. imbricata* Hall.

*Ceramopora* Hall, Amer. Jour. Sci., 2d ser., 11, 1851, p. 400; Pal. New York, 2, 1852, p. 168.—Pictet, Traite de Pal., 4, 1857, p. 170.—Eichwald, Lethæa Rossica, 1, 1860, p. 412.—Zittel, Handb. Pal., 1880, p. 617.—Vine, Quart. Jour. Geol. Soc. London, 36, 1880, p. 358.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 169.—Hall and Simpson, Pal. New York, 6, 1887, p. xviii.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 36.—Miller, N. A. Geol. Pal., 1889, p. 296.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 462.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 112.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 563.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 162; Bull. New York State Mus., 45, 1901, p. 162.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 18.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 121.—Hennig, Archiv. fur Zool., 4, No. 21, 1908, p. 1.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 76; Zittel-Eastman Textb. Pal., 1913, p. 327.

**CERAMOPORA AGELLUS** Hall. See *Ceramopora? confluens*.

**CERAMOPORA ALTERNATA** James. See *Cœloclema alternatum*.

**CERAMOPORA? BEANI** James. See *Paleschara beani*.

**Ceramopora concentrica** James.

Not recognized.

*Ceramopora concentrica* James, Paleontologist, 1, 1878, p. 5.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 38, pl. 1, figs. 8, 8a.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 25.



**Ceramopora concentrica**—Continued.

Eden: Cincinnati, Ohio, and vicinity.

Observation.—Upon restudy in 1906 the type lot was found to contain a mixture of species. The only specimen ever illustrated (James and James, 1888) proved to be an example of *Hallopora onealli sigillarioides*.

**Ceramopora? confluens** Hall.

*Ceramopora confluens* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 7, figs. 4, 5; mus. ed., 1879, p. 119, pl. 8, figs. 4, 5; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 243, pl. 7, figs. 4, 5.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 20, figs. 14, 15.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 197.

*Ceramopora?* (*Berenicea*) *labecula* Hall, 23th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 8, figs. 1-3; mus. ed., 1879, p. 119, pl. 8, figs. 1-3.

*Ceramopora labecula* Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 242, pl. 7, figs. 1-3.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 20, fig. 11.

*Ceramopora agellus* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 8, fig. 6; mus. ed., 1879, p. 120, pl. 8, fig. 6.—Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 243, pl. 7, fig. 6.

Niagaran (Waldron): Waldron, Indiana.

Observation.—This species is probably a *fistuliporoid*. *C. agellus* and *C. labecula* are apparently young specimens.

**Ceramopora? expansa** (James).

*Alveolites expansa* James, Paleontologist, No. 3, 1879, p. 19.

*Ceramopora expansa* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 169; 3, 1888, pl. 17, fig. 13.

Upper Medinan (Brassfield): Clinton County, Ohio.

**Ceramopora? explanata** Hall.

*Ceramopora?* (*Lichenalia?*) *explanata* Hall, Trans. Albany Inst., 10, 1833, p. 61 (abs., 1879, p. 5); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 245.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without restudy of types.

**CERAMOPORA FOLIACEA** Hall. See *Meekopora foliacea*.**Ceramopora imbricata** Hall.

*Ceramopora imbricata* Hall, Pal. New York, 2, 1852, p. 169, pl. 40e, figs. 1a-i.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 463, pl. 39, figs. 1-b.—Grabau, Bull. New York State Mus., 45, 1901, p. 163, fig. 58; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 163, fig. 58.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 19, pl. 6, figs. 1-10.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 121, fig. 181.

Clinton: Rochester, Lewiston, and Lockport, New York; Grimsby, Hamilton, and Thorold, Ontario (Rochester); Osgood, Indiana (Osgood).

*Plesiotypes*.—Cat. Nos. 35464, 43280, U.S.N.M.

**Ceramopora incondita** Ulrich and Bassler.

*Ceramopora?* *incondita* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 260, pl. 41, figs. 13-17; pl. 44, figs. 1-3.

Helderbergian (Keyser): Near Cumberland and Pinto, Maryland; Keyser, West Virginia.

*Cotypes*.—Cat. No. 53667, U.S.N.M.

**CERAMOPORA INCRUSTANS** Hall. See *Fistulipora crustula*.

*Ceramopora?* *irregularis* James. See *Batostoma implicatum* and *B. jamesi*.

*Ceramopora?* (*Berenicea*) *labecula* Hall. See *Ceramopora?* *confluens*.

***Ceramopora niagarensis* Bassler.**

*Ceramopora niagarensis* Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 19, 20, pl. 6, figs. 11–13.

Clinton: Rochester and Lockport, New York; Grimsby, Ontario (Rochester); Osgood, Indiana (Osgood).

*Cotypes*.—Cat. No. 35736, U.S.N.M.

***Ceramopora nicholsoni* James.**

Not recognized.

*Ceramopora nicholsoni* James, Cat. Foss. Cincinnati Group, 1875, p. 3.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 27.

*Monticulipora* (*Fistulipora*) *nicholsoni* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 34, pl. 1, figs. 6, 6c.—J. F. James, *ibid.*, 18, 1896, p. 121, fig. 12.

Maysville: Cincinnati, Ohio, and vicinity.

Observation.—A study of the types in 1906 showed they did not have the characters assigned them by the author of the species.

***Ceramopora?* *notha* Hall.**

*Ceramopora* (*Paleschara?*) *nothus* Hall, Trans. Albany Inst., 10, 1883, p. 62 (abs., 1879, p. 6); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 244.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without a restudy of types.

***CERAMOPORA OHIOENSIS* Nicholson. See *Ceramoporella ohioensis*.**

***CERAMOPORA ORBICULATA* Ringueberg. See *Ceramoporella orbiculata*.**

***CERAMOPORA RADIATA* James. See *Ceramoporella granulosa milfordensis*.**

***Ceramopora?* *rariopora* Hall.**

*Ceramopora rariopora* Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 244; Trans. Albany Inst., 10, 1883, p. 62 (abs., 1879, p. 6).

Niagaran (Waldron): Waldron, Indiana.

Observation.—Species can not be recognized from description.

***CERAMOPORA WHITEI* (James). See *Ceramoporella whitei*.**

***CERAMOPORELLA* Ulrich.**

Genotype: *C. distincta* Ulrich.

*Ceramoporella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156.—Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 464; Geol. Minnesota, 3, 1893, p. 328.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 15.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 564.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Bassler, *ibid.*, 292, 1906, p. 20.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 121.—Cumings, 32d Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 81; Zittel-Eastman Textb. Pal., 1913, p. 327.

***Ceramoporella distincta* Ulrich.**

*Ceramoporella distincta* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 464, pl. 39, figs. 6, 6a.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 200.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 799, pl. 10, fig. 7; pl. 11, figs. 2, 2a.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 327, fig. 462.

**Ceramoporella distincta**—Continued.

- Not *Ceramoporella distincta* Ulrich, Geol. Minnesota, 3, 1893, p. 328, pl. 28, fig. 13; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267, fig. 435.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 565, fig. 130.  
Eden and Maysville (Fairview): Cincinnati, Ohio, and vicinity.  
*Cotypes*.—Cat. No. 43225, U.S.N.M.

**Ceramoporella granulosa** Ulrich.

- Ceramoporella granulosa* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 466, pl. 41, figs. 2, 2a.—Nickles and Bassler, Bull. U. S. Geol. Surv., p. 173, 1900, p. 200.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 799, pl. 11, figs. 3, 3a.  
Richmond: Wilmington, Illinois; Iron Ridge, Wisconsin; Richmond and Versailles, Indiana; Oxford, Waynesville, and other localities in Ohio.  
Sections of *holotype*.—Cat. No. 43227, U.S.N.M.

**Ceramoporella granulosa milfordensis** (James).

- Callopora milfordensis* James, Paleontologist, No. 2, 1878, p. 11.  
*Monticulipora* (*Fistulipora*) *milfordensis* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 36, pl. 1, figs. 7–7b.—J. F. James, *ibid.*, 18, 1896, p. 122.  
*Ceramoporella granulosa-milfordensis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 200.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 28, pl. 6, fig. 7.  
*Ceramopora radiata* James, Paleontologist, No. 2, 1878, p. 12.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 199.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 28.  
*Fistulipora* sp.? Hall and Simpson, Pal. New York, 6, 1889, pl. 14, figs. 15–17; pl. 23, fig. 4.  
Eden: Milford, Ohio; Cincinnati, Ohio, and vicinity.

**Ceramoporella granulosa minor** Bassler.

- Ceramoporella granulosa minor* Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 81, 82, fig. 22.  
Black River (Decorah): Minnesota.  
Ordovician (Jewe and Wassalem): Uxnorn, Esthonia, Russia.

**Ceramoporella inclusa** Ulrich.

- Ceramoporella inclusa* Ulrich, Geol. Minnesota, 3, 1893, p. 329, pl. 28, figs. 8–11.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 565, fig. 132.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122, fig. 178j.  
Black River (Decorah): Cannon Falls, St. Paul, etc., Minnesota.  
*Cotypes*.—Cat. Nos. 43223, 54701, U.S.N.M.

**Ceramoporella interporosa** Ulrich.

- Ceramoporella interporosa* Ulrich, Geol. Minnesota, 3, 1893, p. 330, pl. 28, fig. 12.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 565, fig. 131.  
Trenton (Prosser): Goodhue County, Minnesota.  
*Holotype*.—Cat. No. 43226, U.S.N.M.

*CERAMOPORELLA IRREGULARIS* Bassler. See *Ceramoporella reticulata*.

**Ceramoporella? irregularis** (Whitfield).

- Alveolites irregularis* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 72; Geol. Surv. Wisconsin, 4, 1882, p. 251, pl. 11, figs. 1, 2.  
*Ceramoporella? irregularis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 200.  
Richmond (Maquoketa): Iron Ridge, Wisconsin.



**Ceramoporella ohioensis** (Nicholson).

*Ceramopora Ohioensis* Nicholson, Pal. Ohio, 2, 1875, p. 265, pl. 25, figs. 10a, b, e (not 10c, d).—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1878, p. 37.—Miller, N. A. Geol. Pal., 1889, p. 297, fig. 466.

*Ceramoporella? ohioensis* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 466, pl. 39, figs. 2, 2a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 800, pl. 11, figs. 4–4g.—Grabau and Shimer, N. A. Index Fossils, 1, 1908, p. 122.

Eden—Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee; Illinois; Wisconsin.

*Plesiotype*.—Cat. No. 43224, U.S.N.M.

**Ceramoporella orbiculata** (Ringueberg).

*Ceramopora orbiculata* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 19, pl. 2, figs. 13, 13a.

*Ceramoporella orbiculata* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 20, pl. 9, figs. 12–15.

Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby, Ontario.

*Plesiotypes*.—Cat. No. 35478, U.S.N.M.

**Ceramoporella reticulata** (Spencer).

*Dictyostoma reticulatum* Spencer, Bull. Missouri State Mus., 1, 1884, p. 51, pl. 6, figs. 14, 14a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 601, pl. 6, figs. 14, 14a.

*Dictyostroma reticulatum* Whiteaves, Canadian Rec. Sci., 7, 1896, p. 145.

*Ceramoporella irregularis* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 21, pl. 9, figs. 7–9.—Parks, Univ. Toronto Studies, geol. ser., No. 5, 1908, p. 63, pl. 9, fig. 9; pl. 14, fig. 1.

Clinton (Rochester): Hamilton, Ontario; Rochester, New York.

*Plesiotype*.—Cat. No. 35480, U.S.N.M. (Bassler's type of *C. irregularis*).

**Ceramoporella stellata** Ulrich.

*Ceramoporella stellata* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 465, pl. 41, figs. 1, 1a. Richmond (Maquoketa): Sterling, Illinois.

**Ceramoporella triloba** Cumings and Galloway.

*Ceramoporella triloba* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 74, pl. 6, figs. 1–1c.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

**Ceramoporella tubulosa** Cumings and Galloway.

*Ceramoporella tubulosa* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 75, pl. 6, figs. 2, 2a; pl. 7, figs. 1–1c.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

**Ceramoporella whitei** (James).

*Ceramopora Whitei* James, Paleontologist, No. 2, 1878, p. 12.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 38, pl. 1, figs. 9, 9a.

*Ceramoporella whitei* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 201 (gen. ref.).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 29, pl. 5, fig. 6; pl. 6, figs. 8–10.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 801.

Maysville: Cincinnati, Ohio, and vicinity.

**CERATELLA** Ulrich. See *Ceratopsis* Ulrich.

**CERATIOCARIS** McCoy.

Genotype: *C. solenoides* McCoy.

*Ceratiocaris* McCoy, Ann. Mag. Nat. Hist., 2d ser., 1849, p. 412; Cont. British Pal., 1854, p. 151, fig.—Miller, N. A. Geol. Pal., 1889, p. 537.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 375.—Clarke, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 750.

**Ceratiocaris aculeata** (Hall).

*Ceratiocaris aculeatus* Hall, Pal. New York, 3, 1859, p. 422, pl. 80A, fig. 10.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 355.—Jones and Woodward, Mon. British Pal. Phyllopoda, Pal. Soc., 1888, p. 62.

Cayugan (Bertie): Waterville, New York.

**Ceratiocaris acuminata** Hall.

*Ceratiocaris acuminatus* Hall, Pal. New York, 3, 1859, p. 422, pl. 84, fig. 6.—Pohlman, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 28, pl. 3, fig. 2.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 354.—Jones and Woodward, Mon. British Pal. Phyllopoda, Pal. Soc., 1888, p. 27.—Stose, Proc. Boston Soc. Nat. Hist., 26, 1894, p. 369, figs.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 227, fig. 159; Bull. New York State Mus., 45, 1901, p. 227, fig. 159.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 375, fig. 1676.

Cayugan (Bertie): Buffalo, New York.

**Ceratiocaris deweyi** (Hall).

*Onchus deweyi* Hall, Pal. New York, 2, 1852, p. 320, pl. 71, figs. 3a-d.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 824, fig. 639.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 495, figs.

*Ceratiocaris?* *deweyi* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 83.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 354.

*Ceratiocaris* (*Phasganocaris?*) *deweyi* Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 227, fig. 160; Bull. New York State Mus., 45, 1901, p. 227, fig. 160.

Clinton (Rochester): Lockport and Rochester, New York.

*CERATIOCARIS GRANDIS* Pohlman. See *Pterygotus* (*Erettopterus*) *grandis*.

**Ceratiocaris maccoyana** Hall.

*Ceratiocaris maccoyanus* Hall, Pal. New York, 3, 1859, p. 421, pl. 84, figs. 1-5.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 354.

Cayugan (Bertie): Buffalo, New York.

**Ceratiocaris** (**Limnocaris**) **præcedens** Clarke.

*Ceratiocaris* (*Limnocaris*) *præcedens* Clarke, 54th Rep. New York State Mus., 1901, p. 92, pl. 3, figs. 5-10.

Cayugan (Pittsford): Near Pittsford, Monroe County, New York.

**CERATOCEPHALA** Warder.

Genotype: *C. goniata* Warder.

*Ceratocephala* Warder, Amer. Jour. Sci., 34, 1838, pp. 377, 378.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 139.—Clarke, 10th Rep. State Geol. New York for 1890, 1891, pp. 63, 66-68; 44th Rep. New York State Mus., 1892, p. 93, 96-98.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 722.

*Acanthaloma* Conrad, 3d Ann. Rep. New York. Geol. Surv., 1840, p. 205.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 23.—Hall, Pal. New York, 3, 1861, p. 370.—Clarke, 10th Rep. State Geol. New York for 1890, 1891, p. 64; 44th Rep. New York State Mus., 1892, p. 94.

**Ceratocephala anchoralis** (Miller).

*Acidaspis anchoralis* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 349, figs. 23, 24; N. A. Geol. Pal., 1889, p. 526, figs. 951, 952.

Maysville: Cincinnati, Ohio, and vicinity.

**Ceratocephala ceralepta** Anthony.

*Ceratocephala ceralepta* Anthony, Amer. Jour. Sci., 34, 1838, p. 379, figs.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.—Clarke, 44th Rep. New York State Mus., 1892, pp. 98, 101.



**Ceratocephala ceralepta**—Continued.

- Acidaspis ceralepta* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 169, pl. 14, figs. 8, 9.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 130.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1052, pl. 54, figs. 1, 1a. Maysville: Cincinnati, Ohio, and vicinity.

**Ceratocephala cincinnatiensis** (Meek).

- Acidaspis Cincinnatiensis* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 167, pl. 14, fig. 3.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 130.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1023, pl. 54, figs. 2, 4.
- Ceratocephala cincinnatiensis* Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.
- Acidaspis rhynchocephalus* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 169.—Miller, Cincinnati Quart. Jour. Sci., 1874, p. 131.
- Eden: Cincinnati, Ohio and vicinity.

**Ceratocephala coalescens** Van Ingen.

- Ceratocephala coalescens* Van Ingen, School of Mines Quart., 23, 1901, p. 48, fig. 11, p. 41.
- Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**CERATOCEPHALA CROSOTUS** Vogdes. See *Odontopleura crosota*.

**Ceratocephala depauperata** Van Ingen.

- Ceratocephala goniata depauperata* Van Ingen, School of Mines Quart., 23, 1901, p. 42.
- Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**Ceratocephala fimbriata** (Hall).

- Acidaspis fimbriata* Hall, 11th Rep. Dep. Geol. Nat. Hist., Indiana, 1882, p. 334, pl. 33, fig. 11; Trans. Albany Inst., 10, 1883, p. 76.
- Ceratocephala fimbriata* Clarke, 44th Rep. New York State Mus., 1892, p. 101 (gen. ref.).
- Niagaran (Waldron): Waldron, Indiana; Newson, Tennessee.

**Ceratocephala goniata** Warder.

- Ceratocephala goniata* Warder, Amer. Jour. Sci., 1st ser., 34, 1838, p. 378, fig.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.—Clarke, 44th Rep. New York State Mus. Nat. Hist., 1892, pp. 91–100, pl. 1, fig. 1.—Kindle, 28th Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 480, pl. 24, fig. 13.—Van Ingen, School of Mines Quart., 23, 1901, p. 42, pl., figs. 3, 3a.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 255, pl. 23, figs. 1–2.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 38.
- Acidaspis ida* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, pp. 106, 109, 112, pl. 3, fig. 13.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.
- Acidaspis danai* Hall, Geol. Surv. Wisconsin, 1, 1862, p. 432 (no description); Adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 28; 20th Rep., 1867, p. 333, pl. 21, figs. 8, 9, p. 389; rev. ed., 1870, p. 423, pl. 21, figs. 8, 9.
- Niagaran: Near Springfield, Ohio; Bridgeport, etc., Illinois; Port Daniel, Bay of Chaleurs and Lake Memphremagog, Quebec.

**CERATOCEPHALA GONIATA DEPAUPERATA** Van Ingen. See *Ceratocephala depauperata*.

**CERATOCEPHALA HALLI** Vogdes. See *Odontopleura halli*.



**Ceratocephala horani** (Billings).

*Acidaspis horani* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 341; Geol. Canada, Geol. Surv. Canada, 1863, p. 190, fig. 190.

*Ceratocephala Horani* Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.—Clarke, 10th Rep. State Geol. New York, 1891, pp. 69, 71; 44th Rep. New York State Mus., 1892, pp. 99, 101.

Trenton: Riviere a la Friponne near Cape Tourment, Canada.

**Ceratocephala narrawayi** Raymond.

*Ceratocephala narrawayi* Raymond, 7th Rep. State Geol. Vermont, 1910, p. 234, pl. 38, fig. 5; pl. 39, fig. 15; Ann. Carnegie Mus., 7, 1910, p. 73, pl. 18, fig. 5; pl. 19, fig. 15.—Perkins, 8th Rep. Vermont State Geol., 1912, pl. 18, fig. 5.

Chazy (Crown Point): Chazy, New York.

**Ceratocephala nodulata** Van Ingen.

*Ceratocephala nodulata* Van Ingen, School of Mines Quart., 23, 1901, p. 44, fig. 10; p. 41, figs. 4, 5.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**CERATOCEPHALA TRENTONENSIS?** Vogdes. See *Odontopleura trentonensis*.

**CERATOPEA** Ulrich.

Genotype: *C. keithi* Ulrich.

*Ceratopea* Ulrich, Bull. Geol. Soc. Amer., 22, 1911, p. 665.

**Ceratopea keithi** Ulrich.

Operculum of ?*Machurea*, Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 20, fig. 3.

*Ceratopea keithi* Ulrich, Bull. Geol. Soc. Amer., 22, 1911, p. 665.

Canadian (Beekmantown): Wytheville, Virginia; Tennessee; Missouri.

**CERATOPORA** Grabau.

Genotype: *C. jacksoni* Grabau.

*Ceratopora* Grabau, Proc. Boston Soc. Nat. Hist., 28, 1899, p. 414; Bull. Buffalo Soc. Nat. Hist., 6, 1899, p. 132.

**Ceratopora? marylandica** Swartz.

*Ceratopora? marylandica* Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 220, pl. 26, figs. 6, 7.

Helderbergian (Keyser): Keyser, West Virginia; Maryland.

**Ceratopora regularis** Grabau.

*Ceratopora regularis* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 109, pl. 11, fig. 8.

Upper Monroan (Amherstburg): Detroit River opposite Amherstburg, Ontario.

**Ceratopora tenella** (Rominger).

*Syringopora tenella* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 81, pl. 30, fig. 4.

*Ceratopora tenella* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 110, pl. 14, fig. 6.

Niagaran: Point Detour, Drummonds Island, Lake Huron.

Upper Monroan (Anderdon): Near Amherstburg, Ontario.

**CERATOPSIS** Ulrich.

Genotype: *Beyrichia chambersi* Miller.

*Ceratella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 113 (nom. nud.).

*Ceratopsis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 675; Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 308.—Bonnema, Mitt. Min. Geol. Inst. Groningen, 2, 1909, p. 39.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1040.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 738.

**Ceratopsis chambersi** (Miller).

*Beyrichia chambersi* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 234, fig. 27;  
N. A. Geol. Pal., 1889, p. 534, fig. 975.

*Tetradella chambersi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 112.

*Ceratopsis chambersi* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 676, pl. 46, figs. 19-22.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 39, figs. 13-16.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1042, pl. 53, figs. 1, 1a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352, fig. 1660a-c.—Ruedemann (var.), Bull. New York State Mus., 162, 1912, p. 121, pl. 9, fig. 15.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425k.

Black River and Trenton: Minneapolis, etc., Minnesota.

Eden: Cincinnati, Ohio, and vicinity; Albany County, New York (Indian Ladder).

*Plesiotypes*.—Cat. No. 41506, U.S.N.M.

**CERATOPSIS CHAMBERSI ROBUSTA** Cumings. See *Ceratopsis robusta*.

**Ceratopsis intermedia** Ulrich.

*Ceratopsis intermedia* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 676.

Trenton: Covington, etc., Kentucky.

*Cotypes*.—Cat. No. 41500, U.S.N.M.

**Ceratopsis oculifera** (Hall).

*Beyrichia oculifera* Hall, 24th Rep. New York State Mus. Nat. Hist., 1872, p. 232, pl. 8, figs. 9, 10 (extract, 1871, p. 8, pl. 4, fig. 10).—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 118.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 103, pl. 4, figs. 9, 10.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 21, pl. 4, figs. 19a, b, 20.

*Tetradella oculifera* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 113, fig. 1.

*Ceratopsis oculifera* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 676.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 39, figs. 19, 20.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1044, pl. 53, figs. 3, 3a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352, fig. 1662.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**Ceratopsis? quadrifida** (Jones).

*Beyrichia quadrifida* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 66, pl. 11, figs. 9a, b.

*Ceratopsis? quadrifida* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 308, pl. 39, figs. 21, 22.

Trenton: Lorette Falls, Quebec.

**Ceratopsis robusta** (Ulrich).

*Beyrichia chambersi* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 104, pl. 4, figs. 11, 12.

*Beyrichia chambersi* var. *robusta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 677, fig. 50.

*Ceratopsis chambersi* var. *robusta* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1043, pl. 53, figs. 2, 2a.

*Ceratopsis robusta* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 308, pl. 39, figs. 17, 18.

Richmond: Waynesville, etc., Ohio; Richmond and Versailles, Indiana; near Spring Valley, Minnesota.

*Holotype*.—Cat. No. 41335, U.S.N.M.



**CERATOPYGE** Hawle and Corda.Genotype: *Olenus forficula* Sars.

*Ceratopyge* Hawle and Corda, Abh. böhmischen Gesell. d. Wiss., 5, 1847 (extract), p. 161, pl. 7, fig. 81.—Koken, Die Leitfossilien, Leipzig, 1896, p. 19, text fig. 12.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 25.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 717.

***Ceratopyge canadensis*** Walcott.

*Ceratopyge canadensis* Walcott, Smiths. Misc. Coll., 57, 1912, p. 233, pl. 35, figs. 13-22.

Lower Ordovician (Goodsir): Mollison Creek, and Ice River Valley, ten miles southeast of Leancoil, British Columbia.

**CERAURINUS** Barton.Genotype: *C. marginatus* Barton.

*Cheirurus* and *Ceraurus* (part) of authors.

*Ceraurinus* Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 547.

***Ceraurinus confluens*** Barton.

*Ceraurinus confluens* Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 555, pl., fig. 3.

Trenton (Picton): Pefferlaw and Collingwood, Ontario.

***Ceraurinus icarus*** (Billings).

*Cheirurus Icarus* Billings, Canadian Nat. Geol., 5, 1860, p. 67, fig. 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 219, fig. 231; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 27 (loc. ref.).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 128 (loc. occ.).

*Ceraurus* (*Eccoptochile*) *icarus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738 (gen. ref.).

*Ceraurus icarus* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 162, pl. 14, figs. 11a-c.—Miller, Cincinnati Quart. Jour. Sci. 1, 1874, p. 133.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1059, pl. 54, figs. 8, 8a.

*Ceraurus meekanus* Miller, N. A. Geol. Pal., 1889, p. 537.

*Eccoptochile?* *meekanus* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 75, pl. 17, figs. 6-9.

*Ceraurinus icarus* Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 551, pl., fig. 7.

Richmond: Charleton Point, English Head, etc., Anticosti (English Head, Charleton, and Gamachian); Stony Mountain, Manitoba (Stony Mountain); Ohio; Indiana; Iowa.

***Ceraurinus marginatus*** Barton.

*Ceraurinus marginatus* Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 550, pl., fig. 1.

Richmond: Manitoulin Island, Lake Huron.

***Ceraurinus polydorus*** (Billings).

*Cheirurus Polydorus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 286, fig. 274.

*Ceraurus polydorus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738 (gen. ref.).

*Ceraurinus polydorus* Barton, Bull. Mus. Comp. Zool., 54, 1913, 549.

Chazy (Quebec-N): Table Head and Portland Creek, Newfoundland.

***Ceraurinus pompilius*** (Billings).

*Cheirurus Pompilius* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 181, fig. 162.

*Ceraurus* (*Ceraurus*) *pompilius* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738.

*Ceraurus* (*Crotalocephalus*) *pompilius* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319.

*Ceraurinus pompilius* Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 550.

Chazy (Mingan): Large Island, Mingan Islands, Quebec.



**Ceraurinus scofieldi** (Clarke).

*Cyrtometopus scofieldi* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 735, fig. 55.

*Ceraurus scofieldi* Miller, N. A. Geol. Pal., 2d App. 1897, p. 787 (gen. ref.).

*Ceraurinus scofieldi* Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 554, pl., fig. 4.

Black River: Minneapolis, Minnesota (Platteville); Newport, New York.

?Stones River (Lebanon); Lebanon, Tennessee.

*Holotype*.—Cat. No. 41952, U.S.N.M.

**Ceraurinus trentonensis** Barton.

*Ceraurinus trentonensis* Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 552, pl., figs. 5, 6.

Trenton (Curdsville): Goat Island, Manitoulin Islands, Lake Huron.

**CERAURUS** Green.

Genotype: *C. pleurexanthemus* Green.

*Ceraurus* Green, Mon. Tril. N. A. 1832, p. 83; Monthly Amer. Jour. Geol., 1, 1832, p. 560.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 540, 551.—Hawle and Corda, Abh. d. bohmischen Gesell. d. Wiss., 5 (ext.), 1847, p. 161, pl. 7, fig. 82.—Hall, Pal. New York, 1, 1847, p. 244.—Roemer, Neues Jahrb., f. Min., etc., 1848, p. 179.—McCoy, Ann. and Mag. Nat. Hist., 2d ser., 4, 1849, p. 400; British Pal. Rocks and Fossils, 1854, p. 153.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 217.—Chapman, Canadian Jour., n. s., 1, 1856, p. 282.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67.—Hitchcock, Geol. Vermont, 1, 1862, p. 300.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31; Expos. Min. Geol. Canada, 1864, p. 139.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 132.—Walcott, Annals Lyceum Nat. Hist. New York, 11, 1875, p. 155 footnote.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 30, 1881, p. 121.—Miller, N. A. Geol. Pal., 1889, p. 537.—W. D. Matthew, Trans. New York Acad. Sci., 12, 1893, p. 238.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, pp. 736, 738.—Walcott, Geol. Mag., dec. 4, 1, 1894, pp. 247, 248; Proc. Biol. Soc. Washington, 9, 1894, p. 91.—Beecher, Amer. Jour. Sci., 4th ser., 13, 1902, p. 167.—Raymond, Annals Carnegie Mus., 3, 1905, p. 375.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1051.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 70.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 527.

Observation.—Most of the above references are to *Ceraurus* in the broad sense.

**CERAURUS (CYRTOMETOPUS) APOLLO** Clarke. See *Anacheirus apollo*.

**CERAURUS BIMUCRONATUS** Roemer. See *Cheirus niagarensis*.

**Ceraurus bispinosus** Raymond and Barton.

*Ceraurus bispinosus* Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 536, pl. 1, figs. 3, 4.

Black River: Tetreauville, Quebec.

**CERAURUS (PSEUDOSPHEREXOCHUS) CLINTONI** Foerste. See *Pseudospherexochus clintoni*.

**CERAURUS CROSOTUS** Locke. See *Odontopleura crosota*.

**Ceraurus dentatus** Raymond and Barton.

*Ceraurus pleurexanthemus* Hall (part), Pal. New York, 1, 1847, pl. 65, figs. 1d, h, i, m; pl. 66, figs. 1a-g.—Emmons, Geology 2d Dist. New York, 1842, p. 390, fig. 6; Amer. Geology, 1, 1855, pl. 15, figs. 1a, f, h, i, k.—Billings, Geol. Canada, 1863, p. 188, fig. 188.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Miller, N. A. Geol. Pal., 1889, p. 538, fig. 984.—Cumings, 32d Ann. Rep. Indiana State Geol. Surv., 1908, pl. 54, figs. 9a-b (after Hall).—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319, fig. 1632.

**Ceraurus dentatus**—Continued.

*Ceraurus dentatus* Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 534, pl. 1, fig. 1; pl. 2, figs. 4, 5.

Trenton: Middleville, etc., New York; Belleville, Coburg, Peterboro, Kirkfield, etc., Ontario.

**Ceraurus elginensis** Slocum.

*Ceraurus elginensis* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 73, pl. 17, figs. 4-5.

Richmond (Maquoketa): Elgin and Bloomfield, Iowa.

**CERAURUS (NIESZKOWSKIA) GLAUCUS** Clarke. See *Nieszkowskia glaucus*.

**Ceraurus granulosus** Raymond and Barton.

*Ceraurus pompilius* Raymond (not Billings), Ann. Carnegie Mus., 3, 1905, pp. 365-6 (not fig. 6), pl. 14, fig. 14; 7th Rep. State Geol. Vermont, 1911, p. 240, pl. 36, fig. 14.

*Ceraurus granulosus* Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 536.

Chazy (Crown Point): Sloop Bay, Valcour Island, New York.

**Ceraurus hudsoni** Raymond.

*Ceraurus hudsoni* Raymond, Ann. Carnegie Mus., 3, 1905, p. 367, pl. 14, fig. 15, p. 375; 7th Rep. State Geol. Vermont, 1910, p. 240, pl. 36, fig. 15.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 535.

*Ceraurus (Crotalocephalus) hudsoni* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319.

Chazy (Crown Point): Sloop Bay, Valcour Island, New York.

**CERAURUS HYDEI** Weller. See *Cheirurus hydei*.

**CERAURUS (ECCOPTOCHILE) ICARUS** Clarke. See *Ceraurinus icarus*.

**CERAURUS ICARUS** Meek. See *Ceraurinus icarus*.

**CERAURUS INSIGNIS** Hall. See *Cheirurus niagarensis*.

**CERAURUS MEEKANUS** Miller. See *Ceraurinus icarus*.

**CERAURUS (CYRTOMETOPUS) MERCURIUS** Clarke. See *Pseudosphærexochus mercurius*.

**Ceraurus milleranus** Miller and Gurley.

?*Calymene bucklandii* Anthony, Amer. Jour. Sci., 36, 1839, p. 106, figs. 1, 2.

*Ceraurus milleranus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 80, pl. 8, fig. 10.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 538, pl. 1, figs. 6-8, pl. 2, fig. 6.—Slocum, Field Mus. Nat. Hist., Geol. Ser. 4, 1913, p. 71, pl. 17, figs. 1-3.

Maysville (Corryville): Cincinnati, Ohio.

Observation.—*Calymene bucklandii* Anthony probably refers to this species, but the description and figures are too poor for accurate identification.

**Ceraurus miseneri** Foerste.

*Ceraurus miseneri* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 228, pl. 4, fig. 7A, B.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 539.

Richmond (Whitewater): Richmond, Indiana; Dayton, Ohio.

**CERAURUS NIAGARENSIS** of authors. See *Cheirurus niagarensis*.



**Ceraurus numitor** (Billings).

*Cheirurus numitor* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 27, fig. 11.

*Ceraurus* (*Nieszkowskia*) *numitor* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738 (gen. ref.).

*Ceraurus numitor* Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 540. Richmond (English Head): English Head, Anticosti.

**CERAURUS NUPERUS** Miller. See *Cheirurus nuperus*.

**CERAURUS (NIESZKOWSKIA) PERFORATOR** Clarke. See *Nieszkowskia perforator*.

**Ceraurus pleurexanthemus** Green.

*Ceraurus pleurexanthemus* Green, Monthly Amer. Jour. Geol., 1, 1832, p. 560, pl. 4, fig. 10; Mon. Tril. N. A., 1832, p. 84, fig. 10, cast 33.—Hawle and Corda, Prodr. monogr. Bohem. trilobiten, 1847, p. 161, pl. 7, fig. 82.—Hall, Pal. New York, 1, 1847, p. 242, pl. 65, figs. 1a-c, 1e-g (not 1d, h, i, m nor pl. 66, fig. 1a-g=*C. dentatus*).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 217, pl. 15, figs. 1b-1e, 1g (not 1a, h, i, k=*C. dentatus*).—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 7.—Hitchcock, Geol. Vermont, 1, 1862, p. 300, fig. 214.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31, fig. 146; p. 201, fig. 197.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 3, 132.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pp. 89, 95; Mus. ed., 1879; Annals Lyc. Nat. Hist., New York, 11, 1876, p. 155, pl. 11; 31st Rep. New York State Mus. Nat. Hist., 1880, pp. 61, 66, pl. 1, figs. 3, 4; Bull. Mus. Comp. Zool., 8, 1881, pp. 191-216, pl. 1, figs. 1-5; pl. 2, figs. 1-4, 6, 8; pl. 3, figs. 2-7; pl. 4, figs. 1, 2, 4-6, 8, 8a; pl. 6, figs. 3-5; Science, 3, 1884, p. 279.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 123, figs.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, pp. 734, 738.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 174.—Ruedemann, Bull. New York State Mus., 49, 1902, p. 67.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 204, pl. 15, fig. 28.—?Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 71.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 528, pl. 1, fig. 1; pl. 2, figs. 1, 2, 7.—Ruedemann, Pal. Univ., Ser. 4, fasc. 1, 1913, pl. 236.

*Cheirurus pleurexanthemus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 236.

Black River and Trenton: Trenton Falls, etc., New York; New Jersey; Ohio; Tennessee; Minnesota; Canada; etc.

*Plastotype*.—Cat. No. 25695, U.S.N.M.

**CERAURUS PLEUREXANTHEMUS** Hall (part). See *Ceraurus dentatus*.

**CERAURUS POLYDORUS** Clarke. See *Ceraurinus polydorus*.

**CERAURUS POMPILIUS** Clarke. See *Ceraurinus pompilius*.

**CERAURUS POMPILIUS** Raymond. See *Ceraurus granulosus*.

**CERAURUS (PSEUDOSPHEREXOCHUS) PROLIFICUS** Clarke. See *Pseudosphærexochus vulcanus*.

**CERAURUS? PUSTULOSUS** Hall. See *Eoharpes pustulosus*.

**CERAURUS RARUS** Walcott. See *Encrinurus rarus*.

**CERAURUS (SPHÆROCORYPHE) ROBUSTA** Clarke. See *Sphærocoryphe robustus*.

**CERAURUS (NIESZKOWSKIA) SATYRUS** Clarke. See *Nieszkowskia satyrus*.



**CERAURUS SCOFIELDI** Miller. See *Ceraurinus scofieldi*.

**Ceraurus?? solitarius** (Billings).

*Cheirurus solitarius* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 206.

Canadian (Beekmantown): Near St. Antoine above Quebec, Canada.

**CERAURUS TARQUINIUS** Miller. See *Cheirurus tarquinius*.

**CERAURUS TRENTONENSIS** Miller. See *Pseudosphærexochus trentonensis*.

**CERAURUS VIGILANS** Hall. See *Encrinurus vigilans*.

**CERIONITES** Meek and Worthen.

Genotype: *Lunulites dactyloides* Owen.

*Cerionites* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 346.—Miller, N. A.

Geol. Pal., 1889, p. 156.

**Cerionites dactyloides** (Owen).

*Lunulites?* *dactyloides* Owen, Geol. Rep. Iowa, Wisconsin, Illinois, 1844, p. 69, pl. 13, fig. 4.

*Lunulites dactyloides* Kayser, Zeits. d. d. geol. Gesell., 27, 1875, p. 780.

*Cerionites* (*Pasceolus*) *dactyloides* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 346, pl. 5, fig. 2.

*Cerionites dactyloides* Whitfield, Geol. Wisconsin, 4, 1882, p. 267, pl. 13, figs. 1-3.—Miller, N. A. Geol. Pal., 1889, p. 156, fig. 97.—Calvin, Proc. Iowa Acad. Sci., 1, pt. 3, 1893, p. 13; Amer. Geol., 12, 1893, pp. 53-57, fig.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895 (ext. 1893), p. 67.

*Pasceolus?* *dactyloides* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 345, pl. 5, figs. 2a-c.

*Cyclocrinus dactyloides* Stolley, Archiv. f. Anthrop. u. Geol. Schleswig-Holsteins, 1, Heft 2, 1896, p. 215 (gen. ref.).

Niagaran: Carroll County, Illinois; Iowa; Wisconsin.

**CERIOPORA CONSTELLATA** Van Cleve. See *Constellaria constellata*.

**Ceromyopsis** Meek.

Genotype: *Cardiomorpha obliquata* Meek.

*Ceromyopsis* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 327; Geol. Surv. Ohio, Pal., 1, 1873, p. 146.

**Ceromyopsis obliquata** Meek.

*Cardiomorpha?? obliquata* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 327 (*Ceromyopsis* n. gen. suggested); Geol. Surv. Ohio, Pal., 1, 1873, p. 146, pl. 12, figs. 4a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 220.

Maysville: Cincinnati, Ohio.

Observation.—No additional specimens of this species have been found. The type is probably a compressed *Cuneamya*.

**CHÆNODOMUS** Ulrich. See *Cymatona* Ulrich.

**CHÆTETES** Fischer.

Genotype: *C. radians* Fischer.

*Chætetes* Fischer, Oryct. du Gouv. Moscou, 1837, p. 159.—Nicholson, Pal. Tab.

Corals, 1879, p. 260.—Rominger, Amer. Geol., 10, 1892, p. 56.—Zittel-Eastman Textb. Pal., 1, 1900, p. 102; *ibid.*, 2d ed., 1913, p. 117.

Not *Chætetes* of many authors, who have used the name for bryozoa.

**CHÆTETES APPROXIMATUS** Nicholson. See *Hallopora dalei*.

**CHÆTETES (MONOTRYPELLA) ARBUSCULUS** Hall and Simpson. See *Monotrypella? arbuscula*.

*Chaetetes arcticus* Haughton.

*Chaetetes arcticus* Haughton, Jour. Royal Soc. Dublin, 1, 1857, p. 246, pl. 10, figs. 3, 4.

Silurian: Beechy Island, Arctic America.

Observation.—Not recognizable. Refers to some species of *Favosites*.

*CHÆTETES ATTRITUS* Nicholson. See *Dekayia aspera*.

*CHÆTETES BRIAREUS* Nicholson. See *Eridotrypa briareus*.

*CHÆTETES CALYCVLUS* James. See *Aspidopora calycula*.

*CHÆTETES CININNATIENSIS* James. See *Monticulipora cincinnatiensis*.

*CHÆTETES? CLATHRATULUS* Nicholson. See *Escharopora pavonia*.

*CHÆTETES CLAVACOIDEUS* James. See *Leptotrypa clavacoidea*.

*CHÆTETES COLUMNARIS* Hall. See *Tetradium columnare*.

*CHÆTETES COMPRESSUS* Ulrich. See *Peronopora compressa*.

*CHÆTETES CONSIMILIS* Hall. See *Monotrypella? consimilis*.

*CHÆTETES CONSTELLATUS* Quenstedt. See *Constellaria florida*.

*CHÆTETES CORTICANS* Nicholson. See *Spatiopora corticans*.

*Chaetetes crustulatus* James.

*Chaetetes crustulatus* James, Paleontologist, No. 1, 1878, p. 1; No. 3, 1879, p. 20.—

Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 202.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 30.

*Monticulipora crustulata* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 23, pl. 1, figs. 2, 2a; 18, 1895, p. 82.

Cincinnati: Cincinnati, Ohio.

Observation.—A variety of forms was included under this name, many of which have since been given other names. The type is lost and the description is so general that it can not be narrowed down to one recognizable form; hence, in the interests of science, the name has been dropped.

*CHÆTETES DALEI* Milne-Edwards and Haime. See *Hallopora dalei*.

*CHÆTETES DALEI* Nicholson. See *Hallopora ramosa*.

*CHÆTETES DECIPIENS* Rominger. See *Peronopora decipiens*.

*CHÆTETES DELICATULUS* Nicholson. See *Bythopora delicatula*.

*CHÆTETES DISCOIDEUS* James. See *Amplexopora? discoidea*.

*CHÆTETES ELEGANS* Ulrich. See *Discotrypa elegans*.

*CHÆTETES EXPANSUS* Ringueberg. See *Orbignyella expansa*.

*CHÆTETES FILIASUS* Milne-Edwards and Haime. See *Amplexopora filiasa*.

*CHÆTETES FLETCHERI* Nicholson. See *Dekayella ulrichi*.

*CHÆTETES FRONDOSUS* Milne-Edwards and Haime. See *Heterotrypa frondosa*.

*CHÆTETES FRONDOSUS* Nicholson. See *Peronopora decipiens*.

*CHÆTETES FRONDOSUS LIMATUS* Quenstedt. See *Heterotrypa frondosa*.

CHÆTETES FRUTICOSUS Hall. See *Monotrypella? arbuscula*.

CHÆTETES FUSIFORMIS Whitfield. See *Lioclemella fusiformis*.

CHÆTETES GRACILIS James. See *Bythopora gracilis*.

CHÆTETES GRANULIFERUS Ulrich. See *Homotrypella granulifera*.

CHÆTETES IMPLICATA Ulrich. See *Batostoma implicatum*.

CHÆTETES IRREGULARIS Ulrich. See *Stigmatella irregularis*.

CHÆTETES JAMESI Nicholson. See *Batostoma jamesi*.

CHÆTETES LÆVIRAMUS Quenstedt. See *Bythopora gracilis*.

*Chætetes lycoperdon* (Say) Hall.

*Chætetes lycoperdon* (Say MS.) Hall, Pal. New York, 1 1847, pp. 48, 64, 276; *ibid.*, II, 1852, p. 40.

*Chætetes* (*Monticulipora*) *lycoperdon* Chamberlin, Geol. Wisconsin, 1, 1883, p. 153, fig.

*Chætetes lycopodites* James, Paleontologist, No. 3, 1879, p. 20.

*Favosites Lycoperdon* Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 363, fig. 3.

Ordovician: Various localities.

Observation.—Not recognized. The term *lycoperdon* was never properly defined and has been applied to many species of bryozoa, especially if they were hemispheric or globose in shape.

CHÆTETES LYCOPODITES James. See *Chætetes lycoperdon* James.

CHÆTETES MAMMULATUS of authors. See *Monticulipora mammulata*, *M. epidermata* and *Heterotrypa frondosa*.

CHÆTETES MEEKI James. See *Bythopora meeki*.

CHÆTETES MINUTUS James. See *Bythopora arctipora*.

CHÆTETES NEWBERRYI Nicholson. See *Aspidopora newberryi*.

CHÆTETES NODULOSUS Nicholson. See *Hallopora nodulosa*.

CHÆTETES? ONEALLI James. See *Hallopora onealli*.

CHÆTETES ORTONI Nicholson. See *Atactoporella ortonii*.

*Chætetes papillatus* Nicholson (not McCoy).

*Chætetes papillatus* Nicholson (not McCoy), Nicholson, Quart. Jour. Geol. Soc.

London, 30, 1874, p. 513, pl. 29, figs. 12–12b; Pal. Ohio, 2, 1875, p. 210.—

Nickles and Bassler, Bull. U. S. Geol. Surv. 173, 1900, p. 205.

Ordovician: Cincinnati, Ohio.

Observation.—The form so referred to can not be identified with certainty from Nicholson's description and figures, but it was probably a species of *Petigopora*, possibly the *P. asperula* Ulrich.

CHÆTETES PAVONIA Milne-Edwards and Haime. See *Escharopora pavonia*.

*Chætetes perantiquus* Whiteaves.

*Chætetes perantiquus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 238, figs. 17, 18, 19.

Black River or Richmond: Lower Fort Garry, Manitoba.

CHÆTETES PETECHIALIS Nicholson. See *Petigopora petechialis*.

CHÆTETES PETROPOLITANA Nicholson (part). See *Mesotrypa whiteavesi*.



*CHÆTETES PETROPOLITANA* James. See *Amplexopora petasiformis*.

*CHÆTETES PETROPOLITANUS* Lonsdale. See *Dianulites petropolitana*.

*Chætetes petropolitanus* of authors (not Pander).

*Chætetes petropolitanus* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 304, pl. 2, figs. 8a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 373.

*Monticulipora petropolitana* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 229, fig. 80.

Ordovician: Various localities.

Observation.—These references are to undetermined species probably different from *Chætetes* (now *Dianulites*) *petropolitana* Pander.

*CHÆTETES PULCHELLUS* Nicholson. See *Hallopora andrewsi*.

*CHÆTETES QUADRATUS* Rominger. See *Rhombotrypa quadrata*.

*CHÆTETES RAMOSUS* Milne-Edwards and Haime. See *Hallopora ramosa*.

*CHÆTETES RHOMBICUS* Nicholson. See *Rhombotrypa quadrata*.

*Chætetes?? rugosus* Hall.

*Chætetes rugosus* Hall., Pal. New York, 1, 1847, p. 67, pl. 24, figs. 2a, b.

Trenton: Middleville, Herkimer County, New York.

Observation.—Possibly a species of *Batostoma*, but the generic position cannot be determined from the description and figures given.

*CHÆTETES RUGOSUS* Milne-Edwards and Haime. See *Hallopora rugosa*.

*CHÆTETES SIGILLARIOIDES* Nicholson. See *Hallopora onealli sigillarioides*.

*CHÆTETES SUBGLOBOSUS* Ulrich. See *Monotrypa subglobosa*.

*CHÆTETES SUBPULCHELLUS* Nicholson. See *Heterotrypa subpulchella*.

*CHÆTETES SUBROTUNDUS* James. See *Hindia subrotundus*.

*CHÆTETES TUBERCULATUS* Milne-Edwards and Haime. See *Spatiopora tuberculata*.

*CHÆTETES TUBERCULATUS* Nicholson. See *Spatiopora corticans*.

*Chætetes turbinatum* James.

Not recognized.

*Chætetes turbinatum* James, Paleontologist, No. 2, 1878, p. 11.—Bassler, Proc.

U. S. Nat. Mus., 30, 1906, p. 31 (gives discussion of species).

*Monticulipora turbinata* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 161, pl. 2, figs. 1a-c.—J. F. James, *ibid.*, 15, 1893, p. 158.

Cincinnati: Cincinnati, Ohio.

*CHÆTETES UNDULATUS* Nicholson. See *Monotrypa undulata*.

*CHÆTETES VARIANS* James. See *Batostoma varians*.

*CHÆTETES VENUSTUS* Ulrich. See *Crepidopora venusta*.

*CHÆTOCLADUS* Whitfield.

Genotype: *C. plumula* Whitfield.

*Chætocladius* Whitfield, Bull. Amer. Mus. Nat. Hist., 16, 1894, p. 356.—Miller,

N. A. Geol. Pal., 2d App., 1897, p. 721.—Ruedemann, Bull. New York State Mus., 133, 1909, p. 204.

*Chætocladius plumula* Whitfield.

*Chætocladius plumula* Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 356,

pl. 11, figs. 11-13; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 4, figs. 11-

13.—Ruedemann, Bull. New York State Mus., 133, 1909, p. 204, figs. 11-13.

Black River (Platteville): Platteville, Wisconsin.

**Chaetocladus sardesoni** Ruedemann.

*Chaetocladus sardesoni* Ruedemann, Bull. New York State Mus., 133, 1909, p. 204, pl. 2, figs. 3-11.

Black River (Platteville): Minneapolis, Minnesota.

**CHÆTOMORPHA** Kuntze. A genus of recent marine algae.**Chætomorpha?? prima** Whitfield.

*Oldhamia fruticosa* Hall (part), Canadian Organic Remains, dec. 2, 1865, p. 50.

*Chætomorpha? prima* Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 355, pl.

11, figs. 9, 10; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 4, figs. 9, 10.—

Ruedemann, New York State Mus., Bull. 133, 1909, p. 203, figs. 9, 10.

Black River (Platteville): Platteville, Wisconsin.

**CHALAZODES** Parks. See *Lophiostroma* Nicholson.**CHARIONELLA?** *HYALE* Billings. See *Whitfieldella hyale*.**CHASMATOPORA** Eichwald.

Genotype: *C. tenella* Eichwald.

Retepora as applied by various authors to Ordovician and Silurian anastomosing bryozoa (not Lamarck, 1801).

*Gorgonia(?)* Hall, Pal. New York, 1, 1847, pp. 16, 76 (not Linnæus, 1745).

*Intricaria* Hall, Pal. New York, 1, 1847, p. 77.—Miller and Dyer, Contr. Pal., No. 2, 1878, p. 7.

*Subretepora* D'Orbigny, Prodr. Pal., 1, 1850, p. 22.—Miller, N. A. Geol. Pal., 1889, p. 326. (See Geol. Surv. Illinois, 8, pp. 683, 687.)

*Chasmatopora* Eichwald, *Lethæa Rossica*, 1, 1860, p. 370.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, pt. 1, p. 27.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 169; Zittel-Eastman Textb. Pal., 1913, p. 340.

*Phyllopora* (in part) Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 150.

Nov. gen. (not named) Ulrich, Contr. Amer. Pal., 1, 1886, p. 5.

*Phylloporina* (Ulrich) Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 150.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 399, 639; Geol. Minnesota, 2, 1893, p. 208.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 17.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 283.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 37.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 168; Bull. New York State Mus., 45, 1901, p. 168.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 48.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 140.

**Chasmatopora angulata** (Hall).

*Retepora angulata* Hall, Pal. New York, 2, 1852, p. 49, pl. 19, figs. 3a-h.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 111, pl. 5, figs. 2-4; 12th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 269, pl. 14, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 861, figs.

*Phylloporina angulata* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 151; 3, 1888, pl. 15, fig. 1; Geol. Surv. Ohio, 7, 1895, p. 600, pl. 28, fig. 1.

*Subretepora angulata* Miller, N. A. Geol. Pal., 1889, p. 326, fig. 523.

*Retepora daytonensis* Hall and Whitfield, Geol. Surv. Ohio, Pal. 2, 1875, p. 111 (proposed at end of description).

Early Silurian: Sodus and Rochester, New York (Clinton); Flamborough Head, etc., Ontario (Cataract); Dayton, etc., Ohio; Kentucky; Tennessee; and Alabama; (Brassfield); West Ellis Bay, Anticosti (Ellis Bay).

**Chasmatopora aspera** (Hall).

*Gorgonia? aspera* Hall, Pal. New York, 1, 1847, p. 16, pl. 4, figs. 3a, b.

*Subretepora aspera* Miller, N. A. Geol. Pal., 1889, p. 326.



**Chasmatopora aspera**—Continued.

Phylloporina aspera Ulrich, Geol. Surv. Illinois, 8, 1890, p. 332, pl. 53, figs. 4-4c.  
Fenestella aspera Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 69  
(gen. ref.).

Chazyan: Chazy, New York; Mingan Islands, Quebec (Mingan).

*Plesiotype*.—Cat. No. 43438, U.S.N.M.

**Chasmatopora asperatostrata** (Hall).

Retepora asperato striata Hall, Pal. New York, 2, 1852, p. 161, pl. 40C, figs. 2a-h.  
Subretopora asperato-striata Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina asperato striata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 332, pl. 53, figs. 5, 5b.—Grabau, Bull. New York State Mus., 45, 1901, p. 169, fig. 68; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 169, fig. 68.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 48, pl. 18, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 141, fig. 196.

Clinton: Lockport, Rochester, Niagara Falls, etc., New York; Grimsby, Thorold, and Hamilton, Ontario (Rochester); Osgood, Indiana (Osgood).

*Plesiotype*.—Cat. No. 43441, U.S.N.M.

**Chasmatopora clathrata** (Miller and Dyer).

Intricaria clathrata Miller and Dyer, Contr. Pal., No. 2, 1878, p. 7, pl. 3, figs. 5, 5a.  
Subretopora clathrata Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina clathrata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity; central Tennessee.

**Chasmatopora corticosa** Ulrich.

Phyllopora? corticosa Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 61.

Subretopora corticosa Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina corticosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639, pl. 53, figs. 3, 3a; Geol. Minnesota, 3, 1893, p. 212, pl. 5, figs. 1-10.—Sardeson, Jour. Geol., 9, 1901, p. 162, pl. B, figs. 11, 12.—Cumings, Amer. Jour. Sci., 4th ser., 20, 1905, pl. 6, fig. 33; Bull. Geol. Soc. Amer., 23, 1912, p. 369, pl. 21, fig. 29.

Black River (Decorah): Goodhue County and St. Paul, Minnesota; Wisconsin.

*Cotypes*.—Cat. No. 43437, U.S.N.M.

**Chasmatopora dawsoni** (Ulrich).

Phylloporina dawsoni Ulrich, Geol. Surv. Illinois, 8, 1890, p. 331, pl. 54, figs. 1-li.

Subretopora dawsoni (Ulrich, in press), Miller, N. A. Geol. Pal., 1889, p. 326.

Trenton: Montreal, Canada; Chimney Point, Vermont.

*Cotypes*.—Cat. No. 43439, U.S.N.M.

**Chasmatopora fenestrata** (Hall).

Retepora fenestrata Hall, 3d Ann. Rep. New York State Cab. Nat. Hist., 1850, p. 178, pl. 2, figs. 1a-e.

Subretopora fenestrata Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina fenestrata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 352 (gen. ref.).—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 143, pl. 7, fig. 6.

Retepora Trentonensis Nicholson, Geol. Mag., n. s., 2, 1875, p. 37, pl. 2, figs. 4-4b; Pal. Prov. Ontario, 1875, p. 15, pl. 2, figs. 4-4b.

Phylloporina trentonensis Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 47, Geol. Surv. Illinois, 8, 1890, p. 640, pl. 53, figs. 1-1c.—Whiteaves, Pal. Foss., 3, 1897, p. 162.



**Chasmatopora fenestrata**—Continued.

Subretepora trentonensis Miller, N. A. Geol. Pal., 1889, p. 326.

Trenton: Lowville, New York; Peterboro, Ontario; St. Andrews, Manitoba; New Jersey.

*Plesiotype*.—Cat. No. 43440, U.S.N.M. (Ulrich).

**Chasmatopora gracilis** (Hall).

Retepora gracilis Hall, Pal. New York, 1, 1847, p. 15, pl. 4, figs. 2, 2a.

Fenestella gracilis Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 74 (gen. ref.).

Subretepora gracilis Miller, N. A. Geol. Pal., 1889, p. 326.

Chazy: Chazy, New York.

**Chasmatopora granistriata** (Ulrich).

Phylloporina granistriata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639, pl. 29, figs. 3, 3a.

Upper Medinan (Girardeau): Alexander County, Illinois.

Richmond (Charleton): Anticosti.

**Chasmatopora halli** (Ulrich).

Phylloporina halli Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 181, fig. 7; Geol. Minnesota, 3, 1893, p. 211, pl. 4, figs. 16-21.

Black River (Decorah): St. Paul, Minnesota.

*Cotypes*.—Cat. No. 43696, U.S.N.M.

**Chasmatopora incepta** (Hall).

Retepora incepta Hall, Pal. New York, 1, 1847, p. 15, pl. 4, figs. 1a, b.

Fenestella incepta Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 74 (gen. ref.).

Subretepora incepta Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina incepta Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 352.

Chazy: Chazy, Clinton County, New York.

**Chasmatopora reticulata** (Hall).

Intricaria? reticulata Hall, Pal. New York, 1, 1847, p. 77, pl. 26, figs. 8a-c.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 158, fig. 123.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 300, figs.

Subretepora reticulata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 206, pl. 7, figs. 8a, 8b, c.—Miller, N. A. Geol. Pal., 1889, p. 326, fig. 524.

Phylloporina reticulata Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 332, 639, pl. 53, figs. 2, 2a; Geol. Minnesota, 3, 1893, p. 210, pl. 4, figs. 8-15.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 141, fig. 201a.

Chasmatopora reticulata Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 170, 171, fig. 86.

Black River and Trenton: Watertown, etc., New York; Vermont; Minnesota; Canada.

Ordovician (Wassaleu): Uxnorn, Esthonia, Russia.

*Plesiotypes*.—Cat. Nos. 43731-43733, U.S.N.M.

**Chasmatopora subblaxa** (Ulrich).

Phylloporina subblaxa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 179, fig. 6; Geol. Minnesota, 3, 1893, p. 209, pl. 4, figs. 1-7.

Chasmatopora subblaxa Bassler, Zittel-Eastman Textb. Pal., 1913, p. 340, fig. 497. Stones River (Pierce and Lebanon): Lebanon, Lavergne, and Murfreesboro, Tennessee.

**Chasmatopora subluxa**—Continued.

Black River (Decorah): Minneapolis, Minnesota.

Chazyan (Mingan): Mingan Islands, Quebec.

*Cotypes*.—Cat. Nos. 43697, 43698, U.S.N.M.

**Chasmatopora variolata** (Ulrich).

Phyllopora variolata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 160, pl. 6, fig. 14.

Subretopora variolata Miller, N. A. Geol. Pal., 1889, p. 326 (gen. ref.).

Phylloporina variolata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639 (gen. ref.).

Eden (McMicken): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43704, U.S.N.M.

**CHASMOPS** McCoy.

Genotype: *Calymene odini* Eichwald.

Chasmops McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 399; British Pal.

Rocks and Fossils, 1854, p. 163; Cont. Brit. Pal., 1854, p. 141, fig.—Roemer,

Zeits. d. d. geol. Gesell., 11, 1859, p. 563 footnote.—Salter, Mon. British

Tril., Pal. Soc., 1864, pp. 15, 36.—Schmidt, Mem. Acad. Imp. Sci. St. Peters-

burg, 7th ser., 30, 1881, pp. 62, 67, 94.—Zittel, Handb. Pal., 2, 1885, p. 615.—

Hall and Clarke, Pal. New York, 7, 1888, p. xxxiv, fig.—Oehlert, Bull. Soc.

Geol. France, 3d ser., 17, 1889, p. 759.—Reed, Geol. Mag., dec. 4, 1, 1894, p.

241.—Koken, Die Leitfossilien, Leipzig, 1896, p. 32, fig. 22.—Beecher, Amer.

Jour. Sci., 4th ser., 3, 1897, p. 105, pl. 3, fig. 31.—Lindstrom, Kongl. Sven.

Vet.-Akad. Handl. 34, No. 8, 1901, pp. 27, 49.—Jaekel, Zeits. d. d. geol.

Gesell., 53, 1901, p. 157.

**Chasmops anticostiensis** (Billings).

Dalmanites Anticostiensis Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 61.

Richmond (Charleton) and Gamachian (Ellis Bay): Junction Cliff, etc., Anticosti.

**Chasmops breviceps** (Hall).

Dalmania breviceps Hall, Desc. n. sp. Crin. etc., 1866, p. 16; Desc. n. sp. Fossils,

Cincinnati, Ohio, 1871, pl. 4, figs. 15, 16; 24th Rep. New York State Cab.

Nat. Hist., 1872, p. 223, pl. 8, figs. 15, 16.—Hall and Whitfield, Geol. Surv.

Ohio, Pal., 2, 1875, p. 108, pl. 4, figs. 16, 17.

Dalmanites breviceps Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 143.—Cum-

ings, 32d. Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1059, pl. 54, figs.

10, 10a.

Dalmanites (Chasmops) breviceps Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 734.

Richmond (Waynesville and Liberty): Lebanon, etc., Ohio; Madison, Indiana.

CHASMOPS TROOSTI Safford and Vogdes. See *Pterygometopus troosti*.

**CHAUNOGRAPTUS** Hall.

Genotype: *Dendrograptus novellus* Hall.

Chaunograptus (subgenus of *Dendrograptus*) Hall, 11th Ann. Rep. Dep. Geol.

Nat. Hist. Indiana, 1882, p. 225.—Ruedemann, Mem. New York State

Mus., 11, pt. 2, 1908, p. 223.

**Chaunograptus gemmatus** Ruedemann.

Chaunograptus gemmatus Ruedemann, Mem. New York State Mus., 11, pt. 2,

1908, pp. 226, 227, fig. 120, pl. 10, fig. 11; pl. 11, fig. 7.

Trenton (Canajoharie): Dolgeville, Herkimer County, New York.

Eden (Economy): Covington, Kentucky.

*Plesiotype*: Cat. No. 54270 U.S.N.M.

**Chaunograptus novellus** (Hall).

*Dendrograptus* (*Chaunograptus*) *novellus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 225, pl. 1, figs. 1, 2; Trans. Albany Inst., 10, 1883, p. 58 (abstract 1879, p. 2).—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 570; Bull. Mus. Univ. State Missouri, 1, 1884, p. 20.

*Chaunograptus novellus* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 41 (gen. ref.); Mem. New York State Mus., 11, pt. 2, 1908, p. 225, pl. 10, fig. 10; pl. 11, fig. 5.

Niagaran (Waldron): Waldron, Indiana.

**Chaunograptus? rectilinea** Ruedemann.

*Chaunograptus? rectilinea* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 227–228, fig. 121, pl. 10, fig. 12.

Trenton (Snake Hill): Van Schaick Island, Cohoes, New York.

**CHEILOPORELLA** Ulrich. See *Chiloporella* Ulrich.

**CHEILOTRYPA** Ulrich. See *Chilotrypa* Ulrich.

**CHEIROCRINUS** Eichwald.

Genotype: *C. penniger* Eichwald.

*Cheirocrinus* Eichwald, Bull. Soc. Imp. Nat. Moscou, 29, pt. 1, 1856, p. 123 (reprint, 1857, p. 69); *Lethæa Rossica*, livr. 5, 1859, p. 645.—Bather, Treatise on Zool., 3, Echinoderma, 1900, p. 63; Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 434.

*Glyptocystites* Billings (part), Geol. Surv. Canada, Rep. Prog., 1857, p. 280.—Chapman, Canadian Jour. n. s., 2, 1857, p. 303.—Billings, Canadian Org. Rem., dec. 3, 1858, p. 53.—Hall, Pal. New York, 3, 1859, p. 151.—Schmidt, Mem. Acad. Imp. Sci. St. Petersburg, 7th ser., 21, No. 2, 1874, p. 8.—Zittel, Handb. Pal., 1, 1879, p. 423.

*Glyptocystis* Angelin, Icon. Crin. Suec., 1878, p. 31.—Carpenter, Jour. Linn. Soc. Zool., 24, 1891, pp. 11, 12.—Haeckel (part), *ibid.*, 1896, p. 150.

*Homocystites* Barrande (part), Sil. Syst. Centre Boheme, 7, pt. 1, 1887, pp. 77, 160.

*Homocystis* Carpenter, Journ. Linn. Soc. Zool., 24, 1891, p. 13.—Haeckel, Amphor. und Cyst., 1896, p. 149.—Bather, Treatise on Zool., 3, Echinoderma, 1900, p. 64.

*Chirocrinus* Jaekel, Stammesg. Pelmat., 1, 1899, p. 212.

**Cheirocrinus anatifomis** (Hall).

*Echino-encrinites anatifomis* Hall, Pal. New York, 1, 1847, pp. 89, 318, pl. 29, fig. 4a–f; 12th Rep. New York State Cab. Nat. Hist., 1860, p. 68.

*Glyptocystites anatifomis* Miller, N. A. Geol. Pal., 1889, p. 269 (gen. ref.).

*Chirocrinus anatifomis* Jaekel, Stammesg. Pelmat., 1, 1899, p. 221.

Trenton: Turin, Lewis County, New York.

**Cheirocrinus angulatus** (Wood).

*Cyathocrinites sculptus* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

*Cyathocrinus sculptus* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 364 (gen. ref.).

*Chirocrinus angulatus* Wood (not *Chirocrinus sculptus* Schmidt), Bull. U. S. Nat. Mus., 64, 1909, p. 7, pl. 8, figs. 9, 10.

Chazy (Ottosee): Knoxville, Tennessee.

*Holotype*: Cat. No. 39951 U.S.N.M. (Troost's type of *C. sculptus*.)

**CHEIROCRINUS CHRYSALIS** Hall. See *Eucheirocrinus chrysalis*.



**Cheirocrinus forbesi** (Billings).

*Glyptocystites forbesi* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 283; Geol. Surv. Canada, dec. 3, 1858, p. 59, pl. 4, figs. 3a-3b.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 463.

*Chirocrinus Forbesi* Jaekel, Stammesges. der Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 221.

*Cheirocrinus forbesi* Bather, Trans. Royal Soc. Edinburgh, 49, pt. 2, 1913, p. 441 (gen. ref.).

Chazy (Aylmer): Caughnawaga, Quebec.

**Cheirocrinus logani** (Billings).

*Glyptocystites logani* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 282; Geol. Surv. Canada, dec. 3, 1858, p. 57, pl. 4, figs. 1a-1j.—Chapman, Canadian Jour., n. s., 6, 1861, p. 514, fig. 85; 8, 1863, p. 198, fig. 179; Expos. Min. Geol. Canada, p. 108, fig. 85; pp. 109, 170, fig. 179.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 464.

*Glyptocystis logani* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).

*Chirocrinus logani* Jaekel, Stammesg. Pelmat., 1, Thecoidea u. Cystoidea, 1899, p. 220.

*Cheirocrinus logani* Bather, Trans. Roy. Soc. Edinburgh, 49, pt. 2, p. 441 (gen. ref.).

Trenton (Curdsville): Island of Montreal and Kirkfield, Canada.

**Cheirocrinus logani gracilis** (Billings).

*Glyptocystites logani* var. *gracilis* Billings, Geol. Surv. Canada, dec. 3, 1858, p. 59, pl. 4, fig. 2.

*Glyptocystites gracilis* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 373.

Trenton: Montreal, Quebec.

CHEIROCRINUS STIGMATUS Hall. See *Deltacrinus stigmatus*.

**Cheirocrinus walcotti** (Jaekel).

*Chirocrinus Walcottii* Jaekel, Stammesg. Pelmat., 1, Thecoidea u. Cystoidea, 1899, p. 221, pl. 11, fig. 8.

Trenton: Trenton Falls, New York.

**CHEIRURUS** Beyrich.

Genotype: *C. exsul* Beyrich.

*Cheirurus* Beyrich, Ueber einige böhmische Tril., 1845, p. 5.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 133, pl. 6, fig. 70.—Salter, Mem. Geol. Surv. United Kingdom, dec. 7, 1853, pp. 1, 9.—Pictet, Traité Pal., 2d ed., 2, 1854, p. 519.—Nieszkowski, Archiv. f. Naturk. Liv.-Ehst.-u. Kurl, 1, 1857, p. 588.—Salter, Mon. Brit. Tril. Pal. Soc., 1864, pp. 60, 61.—Angelin, Pal. Scandinavica, 3d ed., Holmia, 1878, p. 31.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 30, 1881, pp. 122, 125, 126, 132.—Zittel, Handb. Pal., 2, 1885, pp. 616, 617.—Koken, Die Leitfossilien, Leipzig, 1896, p. 34.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 105, pl. 3, fig. 28; Zittel-Eastman Textb. Pal., 1, 1900, p. 635.—Raymond, Ann. Carnegie Mus., 3, 1905, p. 373; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 724.

CHEIRURUS APOLLO Billings. See *Anacheirurus apollo*.

CHEIRURUS ERYX Billings. See *Pseudosphærexochus eryx*.

CHEIRURUS GLAUCUS Billings. See *Nieszkowskia glaucus*.

**Cheirurus hydei** (Weller).

*Ceraurus hydei* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 264, pl. 24, fig. 22.

*Cheirurus hydei* Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 542 (gen. ref.)

Niagaran (Racine): Near Lemont, Illinois.

**CHEIRURUS ICARUS** Billings. See *Ceraurinus icarus*.

**CHEIRURUS MARS** Hudson. See *Nieszkowskia mars*.

**CHEIRURUS MERCURIUS** Billings. See *Pseudosphærexochus mercurius*.

**Cheirurus niagarensis** (Hall).

*Ceraurus insignis* Hall (not Beyrich), Pal. New York, 2, 1852, pp. 300, 303, pl. 66A, fig. 4; pl. 67, figs. 9, 10; Geol. Surv. Wisconsin, 1, 1862, p. 433; adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1865, p. 31; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 335.

*Ceraurus bimucronatus* Roemer (not Murchison), Sil. Fauna West Tennessee, 1860, p. 80, pl. 5, fig. 19.

*Sphærexochus romingeri*? Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 32, fig. 16.

*Ceraurus niagarensis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 376, pl. 21, figs. 10, 11; rev. ed. 1870, p. 427, pl. 21, figs. 10, 11; 11th Rep. Dep. Geol. Nat. Hist. Surv. Indiana, 1882, p. 335, pl. 34, fig. 16; pl. 33, fig. 10.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 1, 1884, p. 42; pt. 2, 1895, p. 107.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 263, pl. 24, figs. 20–21.

*Ceraurus* (*Cheirurus*) *niagarensis* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 189, pl. 32, fig. 16.

*Ceraurus* (*Crotalocephalus*) *niagarensis* Kindle, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 483, pl. 23, figs. 1–2; pl. 24, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319, fig. 1633.

*Cheirurus niagarensis* Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 542 (gen. ref.).

Niagaran (Rochester to Guelph): Rochester, etc., New York; Ontario; Indiana; Tennessee; Wisconsin; Illinois; etc.

**CHEIRURUS NUMITOR** Billings. See *Ceraurus numitor*.

**Cheirurus nuperus** Billings.

*Cheirurus nuperus* Billings, Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 60, fig. 20.

*Ceraurus nuperus* Miller, N. A. Geol. Pal., 1889, p. 538 (gen. ref.).

Anticostian (Gun River—Chicotte): East Point, etc., Anticosti.

**CHEIRURUS PERFORATOR** Billings. See *Nieszkowskia perforator*.

**CHEIRURUS PLEUREXANTHEMUS** Billings. See *Ceraurus pleurexanthemus*.

**CHEIRURUS POLYDORUS** Billings. See *Ceraurinus polydorus*.

**CHEIRURUS POMPILIUS** Billings. See *Ceraurinus pompilius*.

**CHEIRURUS PROLIFICUS** Billings. See *Pseudosphærexochus vulcanus*.

**CHEIRURUS SATYRUS** Billings. See *Nieszkowskia satyrus*.

**CHEIRURUS SOL** Billings. See *Heliomera sol*.

**CHEIRURUS SOLITARIUS** Billings. See *Ceraurus solitarius*.

**Cheirurus tarquinius** Billings.

*Cheirurus Tarquinius* Billings, Proc. Portland Soc. Nat. Hist., 1, 1863, p. 121, pl. 3, fig. 22.

*Ceraurus tarquinius* Miller, N. A. Geol. Pal., 1889, p. 538 (gen. ref.).—Whiteaves, Ann. Rep. Geol. Surv. Canada, n. s., 14, App. F, 1904, p. 59; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 267.

Silurian: Port Daniel, Bay of Chaleur, Quebec; Masardis, Maine.

**CHEIRURUS VULCANUS** Billings. See *Pseudosphærexochus vulcanus* and *Nieszkowskia billingsi*.

**CHIASTOCLONELLA** Rauff.

Genotype: *C. headi* Rauff.

*Chiastoclonella* Rauff, Palæontographica, 41, 1895, p. 244.

**Chiastoclonella headi** Rauff.

*Chiastoclonella* Headi Rauff, Palæontographica, 41, 1895, p. 244, figs. 98–102, p. 117, figs. 5–7; pl. 18, fig. 1 (pls. in vol. 40).

Niagaran (Brownsport): Decatur County, Tennessee.

**CHICAGOCRINUS** Weller.

Genotype: *C. ornatus* Weller.

*Chicagocrinus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 126, fig. 48.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 193.

**Chicagocrinus inornatus** Weller.

*Chicagocrinus inornatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 128, pl. 7, figs. 10–12.

Niagaran (Racine): Joliet, Illinois.

**Chicagocrinus ornatus** Weller.

*Chicagocrinus ornatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 127, pl. 7, fig. 9.

Niagaran (Racine): Bridgeport, Illinois.

**CHILOPORELLA** Ulrich.

Genotype: *Fistulipora flabellata* Ulrich.

*Cheiloporella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 157.

*Chiloporella* Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 381.—Simpson, 14th Ann. Rep. State Geologist New York for 1894, 1897, p. 565.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.

**Chiloporella flabellata** (Ulrich).

*Fistulipora flabellata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 28, pl. 7, figs. 26, 26b.

*Chiloporella flabellata* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 381, pl. 39, figs. 5, 5b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 802, pl. 11, figs. 1, 1a; pl. 12, figs. 1, 1b.

*Chiloporella nicholsoni* (not *Ceramopora nicholsoni* James) Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 207.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Holotype* and *plesiotpye*.—Cat. No. 44110, U.S.N.M.

**CHILOPORELLA NICHOLSONI** Nickles and Bassler. See *Chiloporella flabellata*.



**CHILOTRYPA** Ulrich.Genotype: *Chilotrypa hispida* Ulrich.*Chilotrypa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1884, 7, p. 49.

*Chilotrypa* Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 382; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 269.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 554.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 26.—Grabau, Bull. New York State Mus., 45, 1901, p. 163; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 163.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 125.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 330.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 267.

**Chilotrypa circe** (Billings).*Helopora* Circe Billings, Cat. Sil. Foss. Anticosti, 1886, p. 39.

Anticostian (Jupiter River): Two miles east of Jupiter River, etc., Anticosti.

**CHILOTRYPA?** *COALESCENS* Nickles and Bassler. See *Chilotrypa ostiolata*.**Chilotrypa micropora** Ulrich and Bassler.*Chilotrypa micropora* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 268, pl. 41, figs. 9-12.

Helderbergian (Keyser): Keyser, West Virginia.

*Cotypes*.—Cat. No. 53657, U.S.N.M.**Chilotrypa ostiolata** (Hall).*Trematopora ostiolata* Hall, Pal. New York, 2, 1852, p. 152, pl. 40A, figs. 5a-m.—Nicholson, Pal. Prov. Ontario, 1875, p. 60, fig. 26.*Chilotrypa ostiolata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, pl. 3, figs. 7, 7a.

*Chilotrypa ostiolata* Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 21, figs. 1, 2.—Grabau, Bull. New York State Mus., 45, 1901, p. 164, fig. 60; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 164, fig. 60.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 24, 25, pl. 8, figs. 11-15; pl. 9, figs. 1-4.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 125, figs. 184a-b.

*Trematopora coalescens* Hall, Pal. New York, 2, 1852, p. 150, pl. 40A, figs. 2a, b.  
*Chilotrypa?* *coalescens* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 207.

Clinton: Lockport, etc., New York; Ontario (Rochester); Osgood, Indiana (Osgood).

*Plesiotypes*.—Cat. Nos. 43278, 44117, U.S.N.M.**Chilotrypa varia** (Hall).

*Trematopora varia* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 10, figs. 15-23; mus. ed., 1879, p. 111, pl. 10, figs. 15-23; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 232, pl. 9, figs. 15-23.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1202, figs.

*Diamesopora varia* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.*Chilotrypa varia* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 208.

Niagaran (Waldron): Waldron, Indiana.

**Chilotrypa variolata** (Hall).

*Trematopora variolata* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 11, figs. 9, 10; mus. ed., 1879, p. 113, pl. 9, figs. 9, 10; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 234, pl. 10, figs. 9, 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1203, figs.

*Chilotrypa variolata* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 208.

Niagaran (Waldron): Waldron, Indiana.

**CHIROCRINUS** Jaekel. See *Cheirocrinus* Eichwald.

**CHIROCRINUS LOGANI** Jaekel. See *Glyptocystites logani*.

**CHIROSPONGIA** Miller. See *Pattersonia* Miller.

**CHIROSPONGIA FABERI** Miller. See *Leptopoterion mammiferum*.

**CHIROSPONGIA WENTI** Miller. See *Pattersonia aurita*.

**CHITON CANADENSIS** Billings. See *Priscochiton canadensis*.

**Chloephyucus** Miller and Dyer. Genotype: *C. plumosum* Miller and Dyer.

*Chloephyucus* Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 3.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130.

Observation.—Abandoned by Miller as probably inorganic.

**Chloephyucus filiciforme** (James).

*Buthotrephis filificormis* James, Paleontologist, No. 2, 1878, p. 9; Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 46.

*Chloephyucus filiformis* James, *ibid.*, 7, 1885, p. 159.

Maysville: Lebanon, Ohio.

**Chloephyucus plumosum** Miller and Dyer.

*Chloephyucus plumosum* Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 3, pl. 4, fig. 1.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130, pl. 6, fig. 3; *ibid.*, 14, 1891, p. 46.

Eden: Cincinnati, Ohio.

**CHONDRITES** Sternberg.

Genotype: *Fucoides targionii* Brongniart.

*Chondrites* Sternberg, Flora Vorwelt, 2 (Versuch), pt. 5, 6, 1833, p. 25.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 21, No. 14, 1886, p. 34.—Miller, N. A. Geol. Pal., 1889, p. 114.—Rauff, Neues Jahrb. f. Min. Geol. Pal., 2, 1891, p. 101.

**Chondrites (Buthotrephis) cuneatus** Whiteaves.

*Chondrites (Bythotrephis) cuneatus* Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, p. 140, fig. 8.

Black River or Richmond: Cat Head, Lake Winnipeg, Canada.

**Chondrites cupressinus** Whiteaves.

*Chondrites cupressinus* Whiteaves, Canadian Rec. Sci., 6, 1896, p. 388; Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, p. 141, pl. 17, fig. 1.

Black River or Richmond: Cat Head, Lake Winnipeg, Canada.

**Chondrites gracillimus** Whiteaves.

*Chondrites gracillimus* Whiteaves, Canadian Rec. Sci., 6, 1896, p. 389; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, p. 141, pl. 17, fig. 2.

Black River or Richmond: Inmost Island, Kinnow Bay, Lake Winnipeg.

**Chondrites metissicus** Dawson.

*Chondrites Metissicus* Dawson, Trans. Royal. Soc. Canada, 2d ser., 1, sec. 4, 1896, p. 121.

Canadian? (Levis?): Metis, Quebec.

**Chondrites (Buthotrephis) patulus** Whiteaves.

*Chondrites patulus* Whiteaves, Canadian Rec. Sci., 6, 1896, p. 387.

*Chondrites (Bythotrephis) patulus* Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, pp. 137, 138, figs. 5, 6, 7.

Black River or Richmond: Inmost and Birch Islands, Kinnow Bay, Lake Winnipeg, Canada

**CHONETES** Fischer de Waldheim.Genotype: *Orthis striatella* Dalman.

*Chonetes* Fischer de Waldheim, *Oryct. Gouv. Moscow*, pt. 2, 1837, pp. 134, 193, pl. 26, figs. 8, 9.—Hall, *Pal. New York*, 2, 1852, p. 64.—Billings, *Canadian Jour.*, 6, 1861, p. 349.—Meek and Hayden, *Pal. Upper Missouri*, *Smithsonian Cont. Knowl.*, 172, 1864, p. 22.—Hall, 20th Rep. *New York State Cab. Nat. Hist.*, 1867, p. 242; *Pal. New York*, 4, 1867, p. 115.—Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 122.—Nettelroth, *Kentucky Fossil Shells*, *Mem. Kentucky Geol. Surv.*, 1886, p. 66.—Miller, *N. A. Geol. Pal.*, 1889, p. 339.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, p. 303; 11th Ann. Rep. *New York State Geol.*, 1894, p. 292.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 232, text fig. 192, 4, 7.—Schuchert, *Bull. U. S. Geol. Surv.*, 87, 1897, p. 84.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1899, p. 200.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 316.—Beede, *Univ. Geol. Surv. Kansas*, 6, 1900, p. 67.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 185; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 185.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 233.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 389.

***Chonetes bastini*** Williams.

*Chonetes bastini* Williams, *Proc. U. S. Nat. Mus.*, 45, 1913, p. 337, pl. 30, figs. 6, 7, 10.

Silurian (Pembroke): Leighton Cove, etc., Washington County, Maine.

*Cotypes*.—Cat. No. 58960, 58961, U.S.N.M.

***Chonetes cobscookii*** Williams.

*Chonetes cobscookii* Williams, *Proc. U. S. Nat. Mus.*, 45, 1913, p. 327, pl. 29, fig. 5.

Silurian (Edmunds): South of Field Point, west shore of Cobscook River, Washington County, Maine.

*Holotype*.—Cat. No. 58949, U.S.N.M.

***Chonetes colliculus*** Foerste.

*Chonetes colliculus* Foerste, *Jour. Cincinnati Soc. Nat. Hist.*, 21, 1909, p. 24, pl. 1, figs. 10A, B, C.

Cayugan (Kokomo): Kokomo, Indiana.

***Chonetes cornutus*** (Hall).

*Strophomena cornuta* Hall, *Geol. New York*, Rep. 4th Dist., 1843, p. 73, fig. 3.

*Chonetes cornuta* DeKoninck, *Recher. Animaux Foss.*, pt. 1, 1847, p. 200, pl. 20, fig. 3.—Hall, *Pal. New York*, 2, 1852, p. 64, pl. 21, fig. 10; 2d Ann. Rep. *New York State Geol.*, 1883, pl. 47, fig. 1.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 125, figs.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pl. 16, fig. 1.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 185, fig. 93; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 185, fig. 93.

*Chonetes cf. cornutus* Kindle and Breger, 28th Ann. Rep. *Dep. Geol. Nat. Res. Indiana*, 1904, p. 432, pl. 2, fig. 12.

Upper Clinton: Wayne County, New York; Pennsylvania; Maryland.

***Chonetes edmundsi*** Williams.

*Chonetes edmundsi* Williams, *Proc. U. S. Nat. Mus.*, 45, 1913, p. 323, pl. 29, figs. 6-9.

Silurian (Edmunds): Edmunds Township, Washington County, Maine.

*Cotypes*.—Cat. No. 58945, U.S.N.M.

***Chonetes jerseyensis*** Weller.

*Chonetes jerseyensis* Weller, *Ann. Rep. Geol. New Jersey*, 1900, p. 8; *Geol. Surv. New Jersey*, *Pal.*, 3, 1903, p. 230, pl. 20, figs. 11-16.—Maynard, *Maryland Geol. Surv.*, *Low. Dev.*, 1913, p. 338, pl. 61, figs. 17-19.



**Chonetes jerseyensis**—Continued.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Dawson, Cash Valley, Tonoloway, etc., Maryland; Keyser, West Virginia (Keyser).  
Cayugan (Cobleskill): Schoharie and Litchfield, New York.

**Chonetes jerseyensis spinosus** Maynard.

*Chonetes jerseyensis* var. *spinosus* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 339, pl. 61, fig. 20.  
Helderbergian (Keyser): Hancock, Maryland.

**CHONETES MINIMA** Hall (not Sowerby). See *Chonetes undulatus*.

**CHONETES NOVASCOTICA** Hall, 1879. See *Chonetes novascotica waldronensis*.

**Chonetes novascoticus** Hall.

*Chonetes novascotica* Hall, Canadian Nat. Geol., 5, 1860, p. 144, fig. 2.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 48; Acadian Geol., 3d ed., 1878, p. 595, fig. 199.

*Chonetes* cf. *nova-scotia* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., p. 12, pl. 1, fig. 25.—Katzner, Grundz. d. Geol. d. unt. Amazonas, Leipzig, 1903, pl. 16, fig. 8.

Silurian (Moydart, Stonehouse): Arisaig, Nova Scotia.

**Chonetes novascoticus waldronensis** Foerste.

*Chonetes novascotica waldronensis* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 328.

*Chonetes novascotica* Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 155, pl. 22, figs. 11–14; 11th Rep. Indiana Geol. Nat. Hist., 1882, p. 293, pl. 22, figs. 11–14.

Niagaran (Waldron): Waldron, Indiana.

**Chonetes (Eodevonaria) primigenius** Twenhofel.

*Chonetes (Eodevonaria) primigenius* Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 26, pl. 1, figs. 4, 5.

Richmond (Charleton), Gamachian, and Anticostian: Ellis Bay, Jumpers, etc. Anticosti.

**Chonetes striatellus** (Dalman).

*Orthis striatella* Dalman, Kgl. Svens. Vet.-Akad. Handl., 1828, p. 111, pl. 1, fig. 5.

*Chonetes striatella* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 595.—

Koninck, Animaux Fossiles, pt. 1, 1847, p. 200, pl. 20, figs. 5a–g.—Davidson, Mon. Brit. Sil. Brachiopoda, Pal. Soc., 1871, p. 331, pl. 49, figs. 23–26.

*Chonetes* conf. *striatella* Emerson, Narrative Hall's Sec. Arctic Exped., U. S. Navy Dept., p. 578.

Silurian: Europe; Cape Louis Napoleon, Arctic America.

**Chonetes tenuistriatus** Hall.

*Chonetes tenuistriata* Hall, Canadian Nat. Geol., 5, 1860, p. 145, fig. 3.—Dawson, Acadian Geol., 3d ed., 1878, p. 596, fig. 200.

Silurian (Ross Brook and McAdam): East River, Nova Scotia.

**Chonetes undulatus** Hall.

*Chonetes minima* Hall (not Sowerby), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1876, pl. 22, fig. 15.

*Chonetes undulata* Hall, *ibid.*, 1879, p. 155, pl. 22, fig. 15; 11th Rep. State Geol. Indiana, 1882, p. 294, pl. 22, fig. 15.

Niagaran (Waldron): Waldron, Indiana.

**Chonetes vetustus** Foerste.

*Chonetes vetusta* Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 327; Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 24, pl. 1, fig. 16.

Clinton (Alger): Lewis County, Kentucky.

**CHONOPHYLLUM** Edwards and Haime.

Genotype: *Cyathophyllum perfoliatum* Goldfuss.

*Chonophyllum* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 169, 405.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 457.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 398.—Lindstrom, Geol. Mag., 3, 1866, pp. 360, 411.—Hall and Whitfield, 23d Rep. New York State Cab. Nat. Hist., 1873, p. 233, footnote.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 115.—Zittel, Handb. Pal., 1, 1879, p. 229.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 360.—Miller, N. A. Geol. Pal., 1889, p. 177.—Sherzer, Amer. Geol., 6, 1890, p. 61; 8, 1890, pp. 278-283; Bull. Geol. Soc. Amer., 3, 1892, p. 256, 258.—Nicholson, Rec. Geol. New South Wales, 4, 1894, p. 15.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 185.—Grabau, Bull. New York State Mus., 45, 1901, p. 139, fig. 32; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 139.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 109.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 62. *Craterophyllum* (new subg. of *Chonophyllum*) Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 102.

**Chonophyllum belli** Billings.

*Chonophyllum belli* Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 432.—Sherzer, Amer. Geol., 6, 1890, p. 61; Bull. Geol. Soc. Amer., 3, 1892, p. 268.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 186, pl. 16, figs. 5-6.

Upper Medinan (Cataract?): Manitoulin Island, Lake Huron.

**Chonophyllum (Craterophyllum) canadense** (Billings).

*Ptychophyllum* Canadense Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 107 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).

*Chonophyllum* Canadense Lambe, Ottawa Naturalist, 12, 1899, p. 222; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 185, pl. 17, figs. 1-4.

*Chonophyllum (Craterophyllum) canadense* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 102 (gen. ref.).

Anticostian (Jupiter River, Chicotte): Southwest Point, Anticosti.

**Chonophyllum? capax** Hall.

*Chonophyllum capax* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 410 (ext. 1882, p. 6).—Sherzer, Amer. Geol., 6, 1890, p. 61; Bull. Geol. Soc. Amer., 3, 1892, p. 273.

Niagaran (Louisville): Louisville, Kentucky.

**Chonophyllum greenei** Sherzer.

*Chonophyllum greenei* Sherzer, Bull. Geol. Soc. Amer., 3, 1892, p. 275, pl. 8, fig. 7.

Niagaran (Louisville): Louisville, Kentucky.

**CHONOPHYLLUM NIAGARENSE** Hall. See *Cystiphyllum niagarense*.**Chonophyllum nymphae** (Billings).

*Cyathophyllum nymphae* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 111 (adv. sheets, 1862).

*Chonophyllum nymphae* Lambe, Ottawa Naturalist, 12, 1899, p. 251; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 187, pl. 18, figs. 1, 1a.

Silurian: Anse a la Vieille, Bay of Chaleurs, Quebec.



**Chonophyllum solitarium** Foerste.

Chonophyllum solitarium Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 317, pl. 7, fig. 2.

Clinton (Waco): North of Estill Springs, Kentucky.

**Chonophyllum vadium** Hall.

Chonophyllum vadium Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 272, pl. 15, figs. 1-4; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 410 (ext. 1882, p. 6).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 130, figs.—Sherzer, Amer. Geol., 6, 1890, p. 61; Bull. Geol. Soc. Amer., 3, 1892, p. 273.

Niagaran (Louisville): Louisville, Kentucky.

**Chonophyllum (Craterophyllum) vulcanius** Foerste.

Chonophyllum (Craterophyllum) vulcanius Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 101, pl. 1, fig. 12.

Niagaran (Brownspont): West of Hope Creek, Perry County, Tennessee.

**CHRISTIANIA** Hall and Clarke.

Genotype: *Leptæna subquadrata* Hall.

Christiania Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 298.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 687.—Hall, 11th Ann. Rep. New York State Geol., 1894, p. 290.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 314; 2d ed., 1913, p. 314.

**Christiania subquadrata** Hall.

Leptæna subquadrata Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 46, figs. 32, 33.

Christiania subquadrata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 298, 351, pl. 15, figs. 32, 33; pl. 15A, fig. 36; pl. 20, figs. 18-20; 48th Rep. New York State Mus., 2, 1895, p. 351, pl. 6, figs. 13-18; 14th Rep. State Geol. New York for 1894, 1897, p. 351, pl. 6, figs. 13-18.

Chazyan (Ottosee): Blount County, Tennessee.

**Christiania trentonensis** Ruedemann.

Christiania trentonensis Ruedemann, Bull. New York State Mus., 49, 1901, p. 21, pl. 2, figs. 2-6.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 3, figs. 14-16.

Mohawkian: Rysedorph Hill, Rensselaer County, New York (Rysedorph); Pennsylvania, Maryland, and Virginia (Chambersburg).

**Cladograpsus** Emmons.

Genotype: *C. dissimilaris* Emmons.

Cladograpsus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 107.

**Cladograpsus dissimilaris** Emmons.

Cladograpsus dissimilaris Emmons, Amer. Geology, 1, pt. 2, 1855, p. 107, pl. 1, fig. 15.

"Taconic": Locality not given.

Observation.—Figures and description not sufficient for recognition.

**CLADOGRAPSUS GRACILIS** Carruthers. See *Nemagraptus gracilis*.**Cladograpsus inæqualis** Emmons.

Cladograpsus inæqualis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 107.

Dicranograptus? inæqualis Gurley, Jour. Geology, 4, 1896, p. 96 (gen. ref.).

"Taconic": Parrotsville, Tennessee.

Observation.—Probably a species of *Dicranograptus*, but description is not sufficient for determination.

**CLADOGRAPSUS LINEARIS** Carruthers. See *Pleurograptus linearis*.



**CLADOGRAPUS** RAMOSUS Geinitz. See *Dicranograptus ramosus*.

**CLADOPORA** Hall.

Genotype: *C. seriata* Hall.

*Cladopora* Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, p. 400; Pal. New York, 2, 1852, p. 137; Rep. Geol. Surv. Iowa, 1, pt. 2; 1858, p. 478.—Rominger, Amer. Jour. Sci. and Arts, 2d ser., 34, 1862, p. 390.—Hall and Whitfield, 23d Rep. New York State Cab. Nat. Hist. (extract, 1872, p. 11), 1873, p. 229.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 46.—Zittel, Handb. Pal., 1, 1880, p. 618.—Miller, N. A. Geol. Pal. 1889, p. 178.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 319.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 29.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 146; Bull. New York State Mus., 45, 1901, p. 146.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 253.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 92.

**Cladopora aculeata** Davis.

*Cladopora aculeata* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 1; pl. 49, fig. 2.

Niagaran (Louisville): Near Louisville, Kentucky.

**CLADOPORA** *ÆDILIS* Eichwald. See *Eridotrypa ædilis*.

**Cladopora bifurcata** Grabau.

*Cladopora bifurcata* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 115, pl. 10, figs. 2-4; pl. 12, figs. 7, 8; pl. 15, fig. 1.

Upper Monroan: Amherstburg, Ontario (Anderdon); Wayne County, Michigan (Amherstburg).

**Cladopora cæspitosa** Hall.

*Cladopora cæspitosa* Hall, Pal. New York, 2, 1852, p. 138, pl. 38, figs. 2a-c.

Niagaran (Lockport): Lockport, New York.

**Cladopora cervicornis** Hall.

*Cladopora cervicornis* Hall, Pal. New York, 2, 1852, p. 139, pl. 38, figs. 3a, b.

*Cladopora* cf. *cervicornis* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 116, pl. 14, fig. 5.

Niagaran (Lockport): Lockport, New York.

?Upper Monroan (Amherstburg): Amherstburg, Ontario.

**Cladopora complanata** Davis.

*Cladopora complanata* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 49, fig. 1.

Niagaran: Near Louisville, Kentucky (Louisville); near Linden, Tennessee (Brownspert).

**CLADOPORA** *CRASSA* Lambe. See *Cœnites crassa*.

**Cladopora equisetalis** Davis.

*Cladopora equisetalis* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 7.

Niagaran (Louisville): Louisville, Kentucky.

*Holotype*.—Cat. No. 52642, U.S.N.M.

**Cladopora fibrosa** Hall.

*Cladopora fibrosa* Hall, Pal. New York, 2, 1852, p. 139, pl. 38, figs. 4a, b, and 5a, b.

Niagaran (Lockport-Gasport member): Lockport, New York.

**Cladopora laqueata** Rominger.

*Cladopora laqueata* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 46, pl. 18, fig. 3.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, figs. 8, 9.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 131, fig.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 92.

Niagaran: Near Seul Choix, Michigan; Louisville, Kentucky (Louisville).

*Plesiotypes*.—Cat. No. 52641, U.S.N.M.

**Cladopora lichenoides** Winchell and Marcy.

*Cladopora lichenoides* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 84, pl. 2, fig. 1.

Niagaran (Racine): Chicago, Illinois.

**Cladopora macrophora** Hall.

*Cladopora macrophora* Hall, Pal. New York, 2, 1852, p. 140, pl. 39, figs. 2a, b.

Niagaran (Lockport): Lockport, New York.

**Cladopora menis** Davis.

*Cladopora menis* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, figs. 4, 5.

Niagaran (Louisville): Near Louisville, Kentucky.

**Cladopora multipora** Hall.

*Cladopora multipora* Hall, Pal. New York, 2, 1852, p. 140, pl. 39, figs. 1a-g.—Lambe, Cont. Can. Pal. Geol. Surv. Canada, 4, pt. 1, 1899, p. 29.—Grabau, Bull. New York State Mus., 45, 1901, p. 147, fig. 44; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 147, fig. 44.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 33.

*Favosites multipora* Nicholson, Canadian Jour., n. s., 14, 1873, p. 40.—Nicholson and Hinde, *ibid.*, 14, 1874, p. 148.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 53.

*Favosites Halliana* Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 148.

Niagaran: Lockport and Shelby, New York (Lockport-Guelph); Lake Temiscaming, Quebec.

**Cladopora multiseriata** Weller.

*Cladopora multiseriata* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 271, pl. 26, figs. 2, 3.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 217.

Helderbergian: Near Hainesville, New Jersey (Coeymans); near Cumberland, Maryland (Keyser).

**Cladopora ordinata** Davis.

*Cladopora ordinata* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 2.

Niagaran (Louisville): Near Louisville, Kentucky.

**Cladopora proboscoidalis** Davis.

*Cladopora proboscoidalis* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 3; pl. 97, fig. 21.

Niagaran (Louisville): Near Louisville, Kentucky.

**Cladopora rectilineata** Simpson.

*Cladopora rectilineata* Simpson, Trans. Amer. Phil. Soc., n. s., 16, 1889, p. 459, fig. 30.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 221, pl. 17, figs. 14-17.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 216, pl. 25, figs. 4-7.—Holtedahl, 2d Arct. Exp. "Fram," 1898-1902, No. 32, 1914, p. 14, pl. 4, fig. 7.

**Cladopora rectilineata**—Continued.

Helderbergian: Near Tristates, New York (Decker Ferry); Keyser, West Virginia; near Cumberland, Pinto, etc., Maryland (Keyser); southwestern Ellesmereland, Arctic America.

**Cladopora reticulata** Hall.

*Cladopora reticulata* Hall, Pal. New York, 2, 1852, p. 141, pl. 39, figs. 3a-e.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 85.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 384, pl. 47, fig. 6.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 47, figs. 1, 2.—Miller, N. A. Geol. Pal., 1889, p. 178, fig. 152.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 132, fig.

*Omniretepora anastomosa* D'Orbigny, Prodr. Pal., 1847, p. 45 (not defined).—Boule and Thevenin, Ann. Pal., 1, 1906, p. 7, pl. 3, figs. 3-5.

Niagaran: Louisville, Kentucky (Louisville); West Tennessee (Brownsport); Wisconsin; Lockport, New York.

*Plesiotype*.—Cat. No. 52640, U.S.N.M.

**Cladopora sarmentosa** Hall.

*Cladopora sarmentosa* Hall, Trans. Albany Inst., 10, 1883, p. 59.

Niagaran (Waldron): Waldron, Indiana.

**Cladopora seriata** Hall.

*Cladopora seriata* Hall, Pal. New York, 2, 1852, p. 137, pl. 38, figs. la-m.—Grabau, Bull. New York State Mus., 45, 1901, p. 146, fig. 43; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 146, fig. 43.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 93, fig. 148.

*Favosites?* *seriata* Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 149.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 54.

Niagaran (Rochester, Lockport): Lockport, etc., New York; Ontario.

**Cladopora striata** Davis.

*Cladopora striata* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 6.

Niagaran (Louisville): Near Louisville, Kentucky.

*Holotype*: Cat. No. 51643, U.S.N.M.

*CLADOPORA VERTICILLATA* Winchell and Marcy. See *Cœnites verticillata*.

**CLARKELLA** Walcott.

Genotype: *Polytoechia? montanensis* Walcott.

*Clarkella* Walcott, Smiths. Misc. Coll., 53, 1908, pp. 110-111, 142, 148, pl. 11;

Mon. U. S. Geol. Surv., 51, 1912, p. 809.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 392.

**Clarkella montanensis** Walcott.

*Polytoechia? montanensis* Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 295.

*Clarkella montanensis* Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 810, pl. 104, figs. 2, 2a-d.

Canadian: East side of West Gallatin River, above Gallatin, Montana.

*Holotype* and *paratypes*.—Cat. No. 11857, U.S.N.M.

**CLARKOCERAS** Ruedemann.

Genotype: *Piloceras newton winchelli* Clarke.

*Clarkoceras* Ruedemann, Bull. New York State Mus., 80, 1905, p. 337.

**Clarkoceras newton winchelli** (Clarke).

*Piloceras newton-winchelli* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 767, figs. 8, 9; pl. 47, figs. 1-3.



**Clarkoceras newton winchelli**—Continued.

*Piloceras winchelli* Miller, N. A. Geol. Pal., 2d App., 1897, p. 776.

*Clarkoceras newton-winchelli* Ruedemann, Bull. New York State Mus., 80, 1905, pp. 336, 337, figs. 25, 26.

Canadian (Shakopee): Union township, Houston County, Minnesota.

**CLATHRODICTYON** Nicholson and Murie.

Genotype: *C. vesiculosum* Nicholson and Murie.

*Clathrodictyon* Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878, p. 216, 220; Mon. Sil. Foss. Girvan Dist., 1880, p. 237.—Zittel, Handb. Pal., 1, 1879, p. 286.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 535.—Nicholson, Mon. Brit. Strom., Pal. Soc., 1886, pp. 16, 77; Ann. Mag. Nat. Hist., 5th. ser. 19, 1897, p. 2, footnote.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 149; Zittel-Eastman Textb. Pal., 1, 1900, p. 112.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 40.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 12; No. 5, 1908, p. 14; No. 6, 1909, pp. 7, 28; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 123.

**Clathrodictyon cystosum** Parks.

*Stromatopora vesiculosa* Rominger (not Nicholson and Murie), Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 50.

*Clathrodictyon cystosum* Parks (*Stromatopora cystosa* Rominger MS.), Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 21, pl. 7, figs. 3, 4; pl. 8, figs. 6, 8; No. 6, 1909, p. 29.

Niagaran: Drummond Island; Iowa; Drift at Ann Arbor, Michigan; ?Kentucky; Bessels Bay, Greenland.

*Cotypes*.—Cat. Nos. 36924, 54296, U.S.N.M.

**Clathrodictyon cystosum cylindricum** Parks.

*Clathrodictyon cystosum* var. *cylindricum* Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909, p. 29.

Niagaran: Southampton Island, Hudson Bay, Canada.

**Clathrodictyon cystosum lineatum** Parks.

*Clathrodictyon cystosum* var. *lineatum* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 24, pl. 8, fig. 8; No. 6, 1909, p. 29, pl. 20, fig. 9.

Niagaran: Drift at Ann Arbor, Michigan; Beechy Island, Lancaster Sound, Canada. *Holotype*.—Cat. No. 54238, U.S.N.M.

**Clathrodictyon drummondense** Parks.

*Clathrodictyon drummondense* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 26, pl. 7, fig. 7; pl. 8, figs. 3, 7; No. 6, 1909, p. 30, pl. 20, figs. 7, 8.

Niagaran: Drummond Island; Louisville, Kentucky; Rainy Island, Attawapiskat River, and Southampton Island, Hudson Bay, Canada.

*Holotype* and *paratype*.—Cat. Nos. 36814, 54237, U.S.N.M.

**Clathrodictyon fastigiatum** Nicholson.

*Clathrodictyon fastigiatum* Nicholson, Mon. British Strom., pt. 2, 1886, p. 43, fig. 3; 1888, p. 152, pl. 19, figs. 1-5; Ann. Nat. Hist., 5th ser., 19, 1887, p. 8, pl. 2, figs. 3, 4.—Whiteaves, Pal. Foss., 3, pt. 2, 1895, p. 52; Canadian Rec. Sci., 7, p. 135; Pal. Foss., 3, pt. 4, 1906, p. 328.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 18, pl. 1, fig. 6; No. 5, 1908, p. 24, pl. 7, fig. 8; cf. pl. 7, fig. 4, pl. 8, fig. 6.

Niagaran: Glenelg Township, Elora and Aboyne, Ontario (Guelph); Drummond and Manitoulin Islands, Lake Huron; Drift, Ann Arbor, Michigan.

*Plesiotype*.—Cat. No. 54239, U.S.N.M.

*Clathrodictyon franklinense* Ami. See *Actinostroma franklinense*.

***Clathrodictyon ostiolatum* (Nicholson).**

*Stromatopora ostiolata* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 12, 1873, p. 90, pl. 4, fig. 1a; Pal. Prov. Ontario, 1874, pl. 1, fig. 1, 1a; pt. 2, 1875, p. 63.—Nicholson and Murie, Jour. Linn. Soc. London, Zool., 14, 1878, p. 219, pl. 2, figs. 1, 2.—Nicholson, Ann. Mag. Nat. Hist., 4th ser., 12, 1890, pl. 5, fig. 1a.

*Clathrodictyon* (*Stromatopora*) *ostiolatum* Nicholson, Mon. British Strom., pt. 1, 1886, p. 14.

*Clathrodictyon ostiolatum* Nicholson, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 11, pl. 3, figs. 1-3.—Whiteaves, Pal. Foss., 3, pt. 2, 1895, p. 52; Can. Rec. Sci., 7, 1896, p. 135.—Ruedemann, Mem. New York State Mus., 5, 1903, p. 37, pl. 1, figs. 10-12.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 41.—Whiteaves, Pal. Foss., 3, pt. 4, 1906, p. 328.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 12, pl. 2, figs. 1-2; pl. 5, figs. 7, 8; No. 5, 1908, p. 26.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 87, pl. 8, fig. 6; pl. 13, fig. 1; pl. 16, fig. 18.

Niagaran: Ontario and Shelby and Rochester, New York (Guelph); Owen Sound and Manitoulin Island.

Upper Monroan (Anderdon): Detroit River, Canada.

***Clathrodictyon rectum* Parks.**

*Clathrodictyon rectum* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 28, pl. 14, figs. 5, 7.

Niagaran (Louisville): Louisville, Kentucky.

***Clathrodictyon striatellum* (D'Orbigny).**

*Stromatopora concentrica* Lonsdale, Sil. Syst., 1839, p. 680, pl. 15, fig. 31.

*Stromatopora striatella* D'Orbigny, Prod. Pal., 1, 1850, p. 51.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 145.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 49.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 540.—Whiteaves, Canadian Rec. Sci., 7, 1896, p. 144.

*Stromatopora mammillata* Schmidt, Sil. Form von Esthland, 1858, p. 232.—Von Rosen, Ueber die Natur. der Strom., 1867, p. 71, pl. 8, figs. 1-5.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1, 1883, p. 531, fig. 125.

*Cœnostoma botryoideum* Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 59, pl. 6, figs. 13-13b; Trans. Acad. Sci. St. Louis, 4, 1884, p. 600, pl. 6, figs. 13-13b.

*Clathrodictyon striatellum* Nicholson, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 6, pl. 1, figs. 9, 10; Mon. British Strom., 1886, p. 156, pl. 1, fig. 1, pl. 5, fig. 3; pl. 19, figs. 6-12.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 40, fig. 61b.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 14, pl. 1, figs. 3, 4; pl. 6, fig. 8; No. 5, 1908, p. 25; No. 6, 1909, p. 28.

Silurian: England, Gotland, and Esthonia.

Niagaran: Guelph, Hamilton, Owen Sound, islands of Lake Huron, Southampton Island, Hudson Bay, etc., Canada.

***Clathrodictyon variolare* (Von Rosen).**

*Stromatopora variolaris* Von Rosen, Ueber die Natur der Stromatoporen, 1867, p. 61, pl. 2, figs. 2-5.

*Clathrodictyon variolare* Nicholson, Ann. Mag. Nat. Hist., 5th ser., 7, 1887, p. 4, pl. 1, figs. 4-6; Mon. British Strom., 1892, p. 150, pl. 18, figs. 1-5, pl. 17, fig. 14.—Whiteaves, Canadian Rec. Sci., 7, 1897, p. 130.—Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 19, pl. 7, fig. 2, pl. 8, figs. 1, 9.—1, 9.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 89, pl. 9, figs. 1, 2.



**Clathrodictyon variolare**—Continued.

Niagaran: Mann Island, Lake Temiscaming, Manitoulin Island, Drummond Island, and the north shore of Lake Michigan.

Upper Monroan (Anderdon): Near Amherstburg, Ontario.

*Plesiotype*.—Cat. No. 36825, U.S.N.M.

**Clathrodictyon vesiculosum** Nicholson and Murie.

Stromatopora striatella McCoy, British Pal. Foss., 1851, p. 12.

Clathrodictyon vesiculosum Nicholson, Ann. Mag. Nat. Hist., 5th ser., 19, 1877, p. 1, figs. 1-3.—Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878, p. 220, pl. 2, figs. 11-13, p. 216.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan, 1880, p. 238, pl. 19, fig. 2.—Nicholson, Mon. British Strom., 1892, p. 147, pl. 17, figs. 10-13; pl. 18, fig. 12.—Whiteaves, Can. Rec. Sci., 7, 1896, p. 134.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 40, figs. 61a, 62, 63.—Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 14, pl. 7, figs. 1, 6; pl. 8, figs. 3-5; No. 6, 1909, p. 28.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 68, pl. 3, fig. 8.

Stromatopora concentrica Spencer, Bull. Mus. Univ. Missouri, 1, 1882, p. 45.

Silurian: England and Scotland; Ontario, Michigan, New York, Iowa, Ohio, Illinois, Missouri, and Anticosti.

**Clathrodictyon vesiculosum astrodistans** Parks.

Clathrodictyon vesiculosum var. astrodistans Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 19.

Niagaran: Drummond Island, Lake Huron.

*Cotypes*.—Cat. No. 36925, U.S.N.M.

**Clathrodictyon vesiculosum minutum** (Rominger).

Stromatopora minutum Rominger (part), Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 49.

Clathrodictyon vesiculosum var. minutum Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 19, pl. 7, fig. 6; pl. 8, fig. 5; No. 6, 1909, p. 29.

Niagaran: Lake Temiscaming and Southampton Island, Hudson Bay, Canada.

CLATHROGRAPTUS GEINITZIANUS Lapworth. See Retiograptus geinitzianus.

**CLATHROPORA** Hall.

Genotype: Clathropora frondosa Hall.

Clathropora Hall, Amer. Jour. Sci. Arts, 2d. ser., 11, 1851, p. 400; Pal., New York, 2, 1852, p. 159.—Pictet, Traite de Paleontologie, 2d ed., 4, 1857, p. 170.—Nicholson, Geol. Mag., dec. 2, 1, 1874, p. 124; Pal. Prov. Ontario, 1874, p. 111.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 152.—Vine, Rep. 51st Meeting Brit. Assoc. Adv. Sci., 1882, p. 166.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 39.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1884, p. 153.—Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 392; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 279.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 543.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 45.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 173; Bull. New York State Mus., 45, 1901, p. 173.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 56.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.

**Clathropora alcornis** Hall.

Clathropora alcornis Hall, Pal. New York, 2, 1852, p. 159, pl. 40B, figs. 4a-c.—Grabau, Bull. New York State Mus., 45, 1901, p. 174, fig. 76; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 174, fig. 76.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 56, 57, pl. 20, figs. 1-4.

Clinton (Rochester): Lockport, New York.

Figured section of *holotype*.—Cat. No. 35552; U.S.N.M.



**CLATHROPORA CLINTONENSIS** Hall and Whitfield. See *Clathropora frondosa clintonensis*.

**CLATHROPORA FLABELLATA** Hall. See *Graptodictya proava*.

**Clathropora frondosa** Hall.

*Clathropora frondosa* Hall, Pal. New York, 2, 1852, p. 160, pl. 40B, figs. 5a-e.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 139.—Nicholson, Pal. Prov. Ontario, 1875, p. 59.—(Van Cleve) White, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 385, pl. 55, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 297, fig. 467.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 133, fig.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, fig. 104 (p. 544).—Grabau, Bull. New York State Mus., 45, 1901, p. 174, fig. 75; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 173, fig. 75.—Bassler, Bull. U. S. Geol. Surv., 292, p. 56, pl. 20, figs. 5-11; pl. 21, figs. 6-7.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 11.

Clinton: Lockport, Clinton, etc., New York; Grimsby, etc., Ontario (Rochester); Lewis County, Kentucky (West Union).

*Plesiotypes*.—Cat. No. 44146, U.S.N.M.

**CLATHROPORA FRONDOSA** Foerste (part). See *Clathropora frondosa clintonensis*.

**Clathropora frondosa clintonensis** (Hall and Whitfield).

*Clathropora clintonensis* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 113, pl. 5, fig. 7.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 154; 3, 1888, pl. 15, fig. 4; Geol. Surv. Ohio, 7, 1895, p. 598, pl. 28, fig. 4.

*Clathropora frondosa* Foerste Bull. Sci. Lab. Denison Univ., 2, 1887, p. 154; 3, 1888, pl. 15, fig. 3; Geol. Surv. Ohio, 7, 1895, p. 598, pl. 28, fig. 3.

*Clathropora frondosa-clintonensis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 209.

Upper Medinan: Dayton and Fairhaven, Ohio; Kentucky; Tennessee (Brassfield); Dundas, etc., Ontario (Cataract).

**Clathropora frondosa intermedia** (Nicholson and Hinde).

*Clathropora intermedia* Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 140, fig. 5.—Nicholson, Pal. Prov. Ontario, 1875, p. 59, figs. 29a, b.

*Clathropora frondosa intermedia* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 56, pl. 20, figs. 6-8.

Clinton (Rochester): Thorold and Hamilton, Ontario.

**CLATHROPORA GLOMERATA** Whitfield and Hovey. See *Stictopora? glomerata*.

*Clathropora? gracilis* Spencer.

Not recognizable.

*Clathropora? gracilis* Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 604, pl. 7, fig. 4; Bull. Mus. State Univ. Missouri, 1, 1884, p. 54, pl. 7, fig. 4.

Niagaran: Hamilton, Ontario.

**CLATHROPORA INTERMEDIA** Nicholson and Hinde. See *Clathropora frondosa intermedia*.

**CLATHROSPIRA** Ulrich and Scofield. Genotype: *Pleurotomaria subconica* Hall. *Pleurotomaria* (part) of numerous American and European authors.

*Clathrospira* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 954-1005.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 19.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 948.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 644.

**Clathrospira conica** Ulrich and Scofield.

*Clathrospira conica* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1008, pl. 70, figs. 1-4.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 165.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 644, figs. 878d-f.

Black River and Trenton: Minneapolis, Goodhue and Fillmore Counties, Minnesota; Kentucky; Baffin Land.

Maysville: Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. Nos. 45744, 45746, U.S.N.M.

**Clathrospira convexa** Ulrich and Scofield.

*Clathrospira convexa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1007, pl. 69, fig. 51.

Black River (Platteville): Calhoun County, Illinois.

*Holotype*.—Cat. No. 45747, U.S.N.M.

**Clathrospira deiopela** (Billings).

*Pleurotomaria Deiopela* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 155.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 75, pl. 12, figs. 1, 1a.

*Clathrospira Deiopela* (Ulrich) Whiteaves, Geol. Surv. Canada, Pal. Foss. 3, pt. 4, 1906, p. 332 (gen. ref.).

Niagaran (Guelph): Elora, Ontario.

**Clathrospira subconica** (Hall).

*Pleurotomaria subconica* Hall, Pal. New York, 1, 1847, p. 174, pl. 37, figs. 8a-e; p. 304, pl. 83, figs. 3a-e.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 160, pl. 17, fig. 9a, b.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 606.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 39, fig. 1.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 180, fig. 174; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 17.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 317.—Whitfield, Geol. Wisconsin, 4, 1882, p. 216, pl. 6, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 319.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 716, figs.

*Clathrospira subconica* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1006, pl. 69, figs. 47-50; pl. 70, figs. 5-6.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 33.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 956, pl. 41, figs. 8, 8b.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 644, fig. 878a-c.

Black River—Richmond: Watertown, New York (Trenton); Canada; Ohio; Minnesota; Iowa; Tennessee; Anticosti; etc.

*Plesiotype*.—Cat. Nos. 45748, 46051; U.S.N.M.

**CLAVEBLASTUS** Hambach. See *Troostocrinus* Shumard.

**CLEIDOPHORUS** of authors. See *Clidophorus* Hall.

**CLEIDOPHORUS MAJOR** Ulrich. See *Lyrodesma major*.

**CLEIOCRINUS** Billings.

Genotype: *C. regius* Billings.

*Cleioocrinus* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 276; Geol. Surv. Canada, dec. 4, 1859, p. 52, fig. 17.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 359.—Zittel, Handb. Pal., 1, 1879, p. 357.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 258 (Rev. Pal., pt. 1, p. 35, 147); *ibid.*, 1886, p. 76 (Rev. Pal., pt. 3, p. 152).—Miller, N. A. Geol. Pal., 1889, p. 231.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 191.—Springer, Amer. Geology, 30, 1902, p. 94; Mem. Mus. Comp. Zool. Harvard, 25, No. 2, 1905, p. 93.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 100.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 562.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 186.



**CLEIOCRINUS**—Continued.

*Cleioocrinus* Hudson, Bull. New York State Mus., 149, 1911, p. 211.

*Campanulites* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 356.—Miller, N. A. Geol. Pal., 1889, p. 230.—Bather, Treatise on Zool., 3, Echinodérma, 1900, p. 202 (Genotype *C. tessellatus* Troost.)

***Cleioocrinus billingsi* Ford and Dwight.**

*Cleioocrinus billingsi* Ford and Dwight, Amer. Jour. Sci. Arts, 3d ser., 31, 1886, p. 252, pl. 7, fig. 5.

Middle Ordovician: Canaan, New York.

Observation.—Not recognized. Founded on fragment of a column.

***Cleioocrinus grandis* Billings.**

*Cleioocrinus grandis* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 54, pl. 5, figs. 2a–2c.—Meek, Amer. Jour. Sci. Arts, 3d ser., 2, 1871, p. 301.

Trenton: Ottawa, Ontario.

Observation.—Based on root end of column.

**CLEIOCRINUS LAEVIS** Springer. See *Cleioocrinus tessellatus*.

**CLEIOCRINUS LIBANUS** Safford. See *Cleioocrinus tessellatus*.

***Cleioocrinus magnificus* Billings.**

*Cleioocrinus magnificus* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 54, pl. 5, fig. 3.—Dwight, Proc. Poughkeepsie Acad. Nat. Sci., 1880, p. 19 (loc. occ.).—Springer, Mem. Mus. Comp. Zool., Harvard, 25, 1905, p. 111, pl. 1, figs. 11, 12.

Trenton: Ottawa, Ontario.

Observation.—Based on column only.

***Cleioocrinus perforatus* (Hudson).**

*Cleioocrinus perforatus* Hudson, Bull. New York State Mus., 149, 1911, p. 211, figs. 2, 3.

Chazy (Valcour): Valcour Island, Lake Champlain, New York.

***Cleioocrinus regius* Billings.**

*Cleioocrinus regius* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1857, p. 277; Geol. Surv. Canada, dec. 4, 1859, p. 53, pl. 5, figs. 1a–1g.—Miller, N. A. Geol. Pal., 1889, p. 232, fig. 264.—Springer, Mem. Mus. Comp. Zool., Harvard, 25, 1905, p. 110, pl. 1, figs. 1–10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 562.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 41, pl. 5, figs. 7–9.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

***Cleioocrinus sculptus* Springer.**

*Cleioocrinus sculptus* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 44, pl. 5, figs. 10a–f.

Trenton (Curdsville): Mercer County, Kentucky.

***Cleioocrinus tessellatus* (Troost).**

*Campanulites tessellatus* Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 1850, p. 60.

*Cleioocrinus tessellatus* (Troost) Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 100, pl. 7, fig. 11.



**Cleioerinus tessellatus**—Continued.

*Cleioerinus Libanus* Safford, Geol. Tennessee, p. 285 (not defined).

*Cleioerinus lævis* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 44, pl. 5, figs. 11a-c.

Stones River (Lebanon): Duck River near Columbia, and Shelbyville, Tennessee.

*Holotype*.—Cat. No. 39910, U.S.N.M.

**CLEIONYCHIA** Ulrich. See *Clionychia* Ulrich.

**CLEIONYCHIA AMYGDALINA** Ulrich. See *Ambonychia amygdalina*.

**CLEIONYCHIA ATTENUATA** Ulrich. See *Clionychia lamellosa*.

**CLEIONYCHIA?** *NITIDA* Ulrich. See *Mytilarca nitida*.

**CLELANDIA** Cossmann.

Genotype: *Harrisia parabola* Cleland.

*Harrisia Cleland*, Bull. Amer. Pal., 3, 1900, p. 127 (255).

*Clelandia* (*Harrisia* preoccupied) Cossmann, Revue Critique de Paleozoologie, 6, 1902, p. 52.

**Clelandia parabola** (Cleland).

*Harrisia parabola* Cleland, Bull. Amer. Pal., 3, 1900, p. 127 (255), pl. 16, figs. 1-3; 4, 1903, p. 11, pl. 3, figs. 4, 5.

Canadian (Tribes Hill): Near Fort Hunter, New York.

**CLEMATOCRINUS PARVUS** Jaekel. See *Cordylocrinus plumosus*.

**CLEMATOCRINUS PLUMOSUS** Jaekel. See *Cordylocrinus plumosus*.

**CLEMATOGRAPTUS MULTIBRACHIATUS** Lapworth. See *Amphigraptus multifasciatus*.

**CLEMATOGRAPTUS MULTIFASCIATUS** Hopkinson. See *Amphigraptus multifasciatus*.

**CLIDOCHIRUS** Angelin.

Genotype: *C. pyrum* Angelin.

*Clidochirus* Angelin, Icon. Crin. Suec., 1878, p. 12.—Wachsmuth and Springer, Proc. Nat. Acad. Philadelphia, Rev. Pal., 1, 1879, p. 39.—Zittel, Handb. Pal., 1, 1879, p. 355.—Bather, Lankester's Treatise on Zool., 3, 1900, p. 188.—Springer, Amer. Geol., 30, 1902, p. 94; Jour. Geol., 14, 1906, pp. 479, 516; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 204; Mon. Crin. Flex., Smiths. Inst. (in press).

**Clidochirus americanus** Springer.

*Clidochirus americanus* Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Upper Medinan (Brassfield): Dayton, Ohio.

**Clidochirus keyserensis** Springer.

*Clidochirus keyserensis* Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Helderbergian (Keyser): Keyser, West Virginia.

**CLIDOPHORUS** Hall.

Genotype: *Nuculites planulata* Conrad.

*Cleidophorus* Hall, Pal. New York, 1, 1847, p. 300, footnote.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 534.—Meek and Hayden, Pal. Up. Missouri, Smiths. Cont. Knowl., 172, 14, 1865, p. 35.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 222.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1881, p. 224.—Zittel, Handb. Pal., 2, 1881, p. 53.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 363; 2d ed., 1913, p. 440.

*Cleidophorus* McCoy, Brit. Pal. Rocks and Foss., 1854, p. 273.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 228 (extr. 1871, p. 5).—Miller, N. A. Geol. Pal., 1889, p. 471.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 606.—Cumings, 32d Ann. Rep. Geol. Nat. Res. Indiana, 1903, p. 979.

*Nuculites* Grabau and Shimer (part), N. A. Index Fossils, 1, 1909 p. 397.

**Clidophorus brazilianus** Clarke.

*Clidophorus brazilianus* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 18, pl. 2, figs. 17-19.

Silurian: Rio Trombetas, Brazil.

**Clidophorus chicagoensis** (Miller).

*Clidophorus chicagoensis* Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1881, p. 314, pl. 8, figs. 2, 2a.

Niagaran (Racine): Bridgeport and Cicero, Illinois.

**Clidophorus concentricus** Hall.

*Clidophorus concentricus* Hall, Canadian Nat. Geol., 5, 1860, p. 149, fig. 7.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 53; 2d ed., 1868, p. 600, fig. 204.

Silurian: Arisaig, Nova Scotia.

**Clidophorus consuetus** Ulrich.

*Clidophorus consuetus* Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 223, fig. 9; Geol. Minnesota, 3, pt. 2, 1894, p. 606, pl. 37, figs. 32, 33.

Trenton (Prosser): Near Wykoff, Minnesota.

*Holotype*.—Cat. No. 46110, U.S.N.M.

**Clidophorus cuneatus** Hall.

*Clidophorus cuneatus* Hall, Canadian Nat. Geol., 5, 1860, p. 148.—Dawson, Acadian Geol., 2d ed., 1868, p. 600.

Silurian: Arisaig, Nova Scotia.

**Clidophorus ellipticus** (Ulrich).

*Cleidophorus ellipticus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 25, pl. 7, fig. 22.

Eden (Economy): Covington, Kentucky.

*Holotype*.—Cat. No. 46111, U.S.N.M.

**Clidophorus elongatus** Hall.

*Clidophorus elongatus* Hall, Canadian Nat. Geol., 5, 1860, p. 150, fig. 9.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 55; 2d ed., 1868, p. 601, fig. 206.

Silurian: Arisaig, Nova Scotia.

**Clidophorus erectus** Hall.

*Clidophorus erectus* Hall, Canadian Nat. Geol., 5, 1860, p. 149, fig. 8.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 54; 2d ed., 1868, p. 600, fig. 295.

Silurian: Arisaig, Nova Scotia.

**Clidophorus faberi** Miller.

*Clidophorus faberi* Miller, N. A. Geol. Pal., 1889, p. 471, fig. 795.

Richmond: Near Versailles, Indiana; Butler County, Ohio.

**Clidophorus fabula** (Hall).

*Clidophorus* (*Nucula*) *fabula* Hall, Amer. Jour. Sci. Arts, 43, 1845, p. 295.

*Clidophorus* (*Nuculites*?) *fabula* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 138, pl. 11, figs. 10a, b.

*Cleidophorus fabula* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 222.

*Clidophorus fabula* Miller, N. A. Geol. Pal., 1889, p. 471, fig. 796.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 996, pl. 44, figs. 6, 6a.

Eden—Richmond: Cincinnati, etc., Ohio; Indiana; Kentucky; Tennessee.

Observation.—*C. fabula* is possibly only a dwarfed form of *C. neglectus*.

**Clidophorus ferrugineus** (Foerste).

Nuculites (Clidophorus) ferrugineum Foerste, Geol. Surv. Ohio, Pal., 7, p. 564, pl. 37, figs. 2a, b.

Upper Medinan (Brassfield): Todds Fork, Clinton County, Ohio.

**Clidophorus foerstei** Ruedemann.

Clidophorus foerstei Ruedemann, Bull. New York State Mus., 162, 1912, pl. 5, figs. 15, 16.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

CLIDOPHORUS MCCHESEYANUS Winchell and Marcy. See Matheria recta.

**Clidophorus neglectus** Hall.

Clidophorus neglectus Hall, Geol. Surv. Wisconsin, 1, 1862, p. 55.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 607, pl. 42, figs. 20–25.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 165, pl. 2, fig. 16.

Nuculites neglectus Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 397, figs. 508a–c.

Richmond (Maquoketa): Lafayette County, Wisconsin; Illinois; Iowa; Minnesota; and Missouri; (?)Trenton of New Jersey.

**Clidophorus nuculiformis** Hall.

Clidophorus nuculiformis Hall, Canadian Nat. Geol., 5, 1860, p. 150.—Dawson, Acadian Geol., 2d ed., 1868, p. 601.

Silurian: Arisaig, Nova Scotia.

**Clidophorus obscurus** Raymond.

Clidophorus obscurus Raymond, Amer. Jour. Sci., 20, 1905, p. 372.

Chazyan: (Crown Point) Sloop Bay, Valcour Island, New York.

**Clidophorus planulatus** (Conrad).

Nuculites planulata Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 50.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 397.

Nuculites scitula Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 399, fig. 2.

Periploma planulata D'Orbigny, Prodr. de. Pal., 1, 1849, p. 11 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 172, pl. 17, fig. 17; Manual Geology, 1860, p. 101, figs. 91, 92.

Clidophorus planulatus Hall, Pal., New York, 1, 1847, p. 300, pl. 82, figs. 9a–e.—Pictet, Traité de Pal., 1855, 2d ed., 3, p. 534, pl. 79, fig. 18.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 36, fig. 11e.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 133, fig.

Clidophorus planulatus Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 302.

Eden and Maysville: Pulaski, etc., New York (Pulaski); Pennsylvania; Ohio; etc.

**Clidophorus prævolutus** Foerste.

Clidophorus prævolutus Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 303, pl. 1, figs. 6, 12.

Cincinnatian (Pulaski): Richelieu River, near Chambly, Quebec.

**Clidophorus semiradiatus** Hall.

Clidophorus semiradiatus Hall, Canadian Nat. Geol., 5, 1860, p. 150.—Dawson, Acad. Geol., 2d ed., 1868, p. 601.

Silurian: Arisaig, Nova Scotia.

**Clidophorus subovatus** Hall.

Clidophorus subovatus Hall, Canadian Nat. Geol., 5, 1860, p. 151.—Dawson, Acad. Geol., 2d ed., 1868, p. 602.

Silurian: Arisaig, Nova Scotia.



**Clidophorus ventricosus** Ruedemann.

*Clidophorus ventricosus* Ruedemann, Bull. New York State Mus., 162, 1912, pl. 5, figs. 11-14.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

**CLIFTONIA** Foerste. See *Triplecia* subgenus *Cliftonia*.

**CLIMACOGRAPSUS ANTENNARIUS** Nicholson. See *Cryptograptus antennarius*.

**CLIMACOGRAPTUS** Hall.

Genotype: *Graptolithus bicornis* Hall.

*Climacograptus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 111.—Carruthers, Geol. Mag., 5, 1868, p. 73, 131.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 217.—Hopkinson, Geol. Mag., 7, 1870, p. 354.—Zittel, Handb. Pal., 1, 1879, p. 300.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 55, 1883, p. 13, 14.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 561.—Miller, N. A. Geol. Pal., 1889, p. 178.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 158.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Wiman, Bull. Geol. Inst., Univ. Upsala, 2, pt. 2, 1896, p. 264; Nat. Sci., 9, 1896, p. 188.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 608.—Gurich, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 13, 1900, p. 333.—Zittel-Eastman Textb. Pal., 1, 1900, p. 119.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 729; 11, pt. 2, 1908, pp. 400-406.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 31.—Ruedemann, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 130.

*Climacograpsus* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 6, 1870, p. 370; Mon. British Grapt., 1872, p. 117.

**CLIMACOGRAPTUS ANTENNARIUS** Hall. See *Cryptograptus antennarius*.

**Climacograptus antiquus** Lapworth.

*Climacograptus antiquus* Lapworth, Geol. Mag., 10, 1873, p. 134 (nom. nud.); Trans. Roy. Soc. Canada, 5, sec. 4, 1886, p. 178.—Gurley, Jour. Geol., 6, 1896, pp. 74, 93, 207.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, pp. 199, 200, fig. 130; pl. 27, fig. 4a-e.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 239-441, pl. 28, figs. 28, 29.

*Climacograptus* cf. *antiquus* Lapworth, Rep. Geol. Surv. Canada, 3, pt. 1, 1889, p. 95B.

*Climacograptus caelatus* Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 1, fig. 56; Ann. Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, 1877, p. 130, pl. 6, fig. 39; Science, 9, 1887, p. 320.

Middle Ordovician (Glenkiln): Great Britain.

Chazyan (Normanskill): Canada, Nevada, Arkansas, Oklahoma, etc.

*Plesiotypes*.—Cat. Nos. 54285, 54339, 54248, U.S.N.M

**Climacograptus bicornis** (Hall).

*Graptolithus bicornis* Hall, Pal. New York, 1, 1847, p. 268, pl. 73, figs. 2a-s.—Ford, Amer. Jour. Sci., 3d ser., 28, 1884, p. 206.

*Diplograptus bicornis* Geinitz, Die Graptolithen, 1852, p. 24.—McCoy, Ann. Mag. Nat. Hist., 9, 1862, p. 139.

*Diplograpsus bicornis* Nicholson, Ann. Mag. Nat. Hist., 1, 1868, p. 56, pl. 3, figs. 8-10.

*Diplograptus* (*Climacograptus*) *bicornis* McCoy, Prodr. Pal. Victoria, dec. 1, 1874, p. 12, pl. 1, fig. 8.

*Climacograptus* (*Diplograptus*) *bicornis* Etheridge, Mem. Geol. Surv. Great Britain, 2d ed., 3, 1881, p. 530, pl. 11A, fig. 1b, c.

**Climacograptus bicornis**—Continued.

- Climacograptus bicornis* Hall, Canadian Org. Rem. Geol. Surv. Canada, dec. 2, 1865, p. 112, pl. A, figs. 1a-c.—Nicholson, Ann. Mag. Nat. Hist., 6, 1870, p. 380, fig. 5; Mon. British Grapt., 1872, p. 61, figs. 29a-d.—Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 51; Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, 1877, p. 139, pl. 6, fig. 38a.—Whitfield, U. S. Geol. Surv. West 100th Merid., Wheeler's Rep. Pal., 4, 1877, p. 19.—Lapworth, Quart. Jour. Geol. Soc. London, 34, 1878, p. 250.—Linnarsson, Sver. Geol. Und., Ser. C, No. 31, 1879, p. 18.—Lapworth, Ann. Mag. Nat. Hist., 6, 1880, p. 22.—Tullberg, Sver. Geol. Und., Ser. C, No. 41, 1880; No. 50, 1882, p. 20.—Walcott, Trans. Albany Inst., 10, 1883, p. 3, (adv. sheets, 1879, p. 34).—Whitfield, Amer. Jour. Sci., 3d ser., 26, 1883, p. 380.—Lapworth, Trans. Roy. Soc. Canada, 4, 1887, 178f.—Miller, N. A. Geol. Pal., 1889, p. 178, fig. 153.—Ami, Rep. Canadian Geol. Surv., 2d ser., 3, pt. 2, 1889, p. 117K.—Gurley, Ann. Rep. Geol. Surv. Arkansas, 3, 1892, p. 410.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1892, pt. 2, p. 159.—Ami, Canadian Rec. Sci., 5, 1893, pp. 237, 239.—Gurley, Jour. Geol., 4, 1896, p. 297.—T. S. Hall, Proc. Roy. Soc. Victoria, 9, 1897, p. 184.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 148 (loc. occ.).—Roemer and Frech, Leth. Geog., 1 Theil, Leth. Pal., 1, 1897; pp. 610, 611, fig. 174.—Frech, Leth. Geog., 1 Theil, Leth. Pal., 1, 3 Lief, 1897, p. 553, fig. 131.—T. S. Hall, Geol. Mag., n. s., dec. 4, 6, 1899, p. 445.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 496ff.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—T. S. Hall, Geol. Surv. Victoria, Rec., 1, pt. 1, 1902, p. 34.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—T. S. Hall, Proc. Roy. Soc. Victoria, 18, pt. 1, 1905, p. 21.—Ami, Geol. Surv. Canada, Sum. Rep., 1904, p. 12.—T. S. Hall, Geol. Surv. Victoria, Rec., 1, pt. 4, 1906, p. 275, pl. 34, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32, figs. 50, 51a.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, pp. 193, 194, fig. 126, pl. 26, fig. 8a-f.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 433-437, pl. 28, figs. 24-26, figs. 404, 405.
- Climacograptus bicornis* var. *peltifer* Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 53; Rep. and Proc. Belfast Field Club, 2d ser., 1, pt. 4, 1877, p. 139, pl. 6, fig. 38b.—Gurley, Jour. Geol., 4, 1896, p. 93.
- Climacograptus bicornis* var. *tridentatus* Lapworth, Cat. West Scotland Foss., 1876, p. 6, pl. 2, fig. 52; Rep. and Proc. Belfast Field Club, 2d ser., 1, pt. 4, 1877, p. 139, pl. 6, fig. 38c.—Gurley, Jour. Geol., 4, 1896, p. 93.
- Climacograptus bicornis* var. *tuberculatus* Lapworth, Cat. West Scotland Foss., 1876, p. 6.
- Climacograptus bicornis* var. *longispina* T. S. Hall, Geol. Surv. New South Wales, Rec., 7, pt. 2, 1902, p. 5, pl. 12, figs. 8, 9.
- Chazy (Normanskill): New York slate belt, north into Quebec and New Brunswick and south to Virginia and Alabama; Arkansas (Stringtown).
- Middle Ordovician: Great Britain, Scandinavia, Australia.

**CLIMACOGRAPTUS BICORNIS** Hall (part). See *Climacograptus parvus*.

**CLIMACOGRAPTUS BICORNIS** var. *CAUDATUS* Ami. See *Climacograptus caudatus*.

**CLIMACOGRAPTUS BICORNIS** var. *LONGISPINA* Hall. See *Climacograptus bicornis*.

**CLIMACOGRAPTUS BICORNIS** var. *PELTIFER* Lapworth. See *Climacograptus bicornis*.

**CLIMACOGRAPTUS BICORNIS** var. *TRIDENTATUS* Lapworth. See *Climacograptus bicornis*.

**CLIMACOGRAPTUS BICORNIS TUBERCULATUS** Nicholson. See *Climacograptus bicornis*.



*CLIMACOGRAPTUS CÆLATUS* Lapworth. See *Climacograptus antiquus*.

***Climacograptus caudatus* Lapworth.**

*Climacograptus caudatus* Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 48; Rep. and Proc. Belfast Field Club, 1, pt. 4, 1877, p. 138, pl. 6, fig. 34.—Linnarsson, Sver. Geol. Und. Ser. C, No. 31, 1879, p. 18.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 358; 6, p. 22.—Tullberg, Sver. Geol. Und., Ser. C, No. 50, 1882, p. 20.—Lapworth, Geol. Mag., 3d ser., 6, pl. 2, 1889.—Gurley, Hour. Geol., 4, 1896, p. 297.—Roemer and Frech, Leth. Geog., Leth. Pal., 1, 1897, p. 614, fig. 179.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 520.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, p. 202, fig. 133; pl. 27, fig. 7.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 438, 439, pl. 28, figs. 17, 18, fig. 406.

*Climacograptus bicornis* var. *caudatus* Ami, Canadian Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 116K.

Middle Ordovician shales: Great Britain and Scandinavia.

Trenton: Magog, Quebec (Magog); Mechanicsville, New York (Snake Hill).

***Climacograptus caudatus laticaulis* Gurley.**

*Climacograptus caudatus laticaulis* Gurley, Jour. Geol., 4, 1896, pp. 75, 93 (nom. nud.).

Trenton (Magog): Magog, Quebec.

***Climacograptus caudatus posterus* Ruedemann.**

*Climacograptus caudatus* mut. *posterus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 51 (nom. nud.).

Trenton shale of New York.

***Climacograptus kamptotheca* Gurley.**

*Climacograptus kamptotheca* Gurley, Jour. Geol., 4, 1896, p. 76.

Trenton (Magog): Magog, Quebec.

***Climacograptus mississippiensis* Ruedemann.**

*Climacograptus mississippiensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 413, 414, pl. 28, fig. 13, text fig. 367.

Richmond (Sylvan): Arbuckle Mountains, Oklahoma.

*Holotype* and *paratype*.—Cat. No. 54268, U.S.N.M.

***Climacograptus modestus* Ruedemann.**

*Climacograptus modestus* Ruedemann, Mem. New York State Mus., 11, 1908, pt. 2, pp. 432, 433, pl. 28, fig. 30, 400–403.

Chazy (Normanskill): Mount Moreno, near Hudson, and Lansingburg, New York; Arkansas (Stringtown).

***Climacograptus oligotheca* Gurley.**

*Climacograptus oligotheca* Gurley, Jour. Geol., 4, 1896, p. 76.

*Climacograptus* cf. *oligotheca* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 441, pl. 28, fig. 27.

Trenton: Magog, Quebec (Magog); Arkansas.

*Plesiotype*.—Cat. No. 54264, U.S.N.M.

***Climacograptus parvus* Hall.**

*Climacograptus bicornis* Hall, Pal. New York, 1, 1847, pl. 73, figs. 2e, k, o-s.

*Climacograptus parvus* Hall, Canadian Org. Rem., dec. 2, 1865, p. 57 (nom. nud.); 20th Rep. New York State Cab. Nat. Hist., 1868, p. 224.—Walcott, Trans.

Albany Inst., 10, 1883 (adv. sheets 1879, p. 34); Bull. Geol. Soc. Amer., 1,



**Climacograptus parvus**—Continued.

1890, p. 339.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 610.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 523ff.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—Ruedemann, Mem. New York State Mus. 11, pt. 2, 1908, pp. 426–428, pl. 28, figs. 19–23, figs. 388–393.

*Climacograptus phyllophorus* Gurley, Jour. Geol., 4, 1896, p. 77, pl. 4, figs. 4–6.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 212, pl. 16, figs. 14, 15.

Chazy (Normanskill): Glenmont, Mount Moreno, Troy, etc., New York; New Jersey.

*CLIMACOGRAPTUS phyllophorus* Gurley. See *Climacograptus parvus*.

**Climacograptus pungens** Ruedemann.

*Climacograptus* n. sp. Ruedemann, Ann. Rep. New York State Pal., 1902, p. 571.

*Climacograptus pungens* Ruedemann Mem. New York State Mus., 7, pt. 1, 1904, p. 730, pl. 16, figs. 14–20.

Canadian: Deepkill, and Mount Moreno, New York (Deepkill, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *D. dentatus* zone).

**Climacograptus (Mesograptus) putillus** (Hall).

*Graptolithus putillus* Hall, Geol. Surv. Canada, Org. Rem., dec. 2, 1865, pp. 27, 44, pl. A, figs. 10–12a.

*Graptolithus (Diplograptus) putillus* Hall, 20th Ann. Rep. New York State Cab. Nat. Hist., 1868, pp. 195, 211, pl. 2, figs. 10–12a; rev. ed., 1868 (1870) pp. 224, 225, 226; pl. 2, figs. 10–12.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 82, fig. 3.

*Diplograptus putillus* Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 527, pl. 19, figs. 17, 18.—Tullberg, Sver. Geol. Unders., Ser. C, No. 50, 1882, p. 43.—Walcott, Trans. Albany Inst., 10, 1883 (adv. sheets 1879, p. 35).—Lapworth, Proc. and Trans. Roy. Soc. Can., 4, 1886, p. 170.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.—Ami, Canadian Rec. Sci., 5, 1893, p. 244.—Gurley, Jour. Geol., 4, 1896, p. 298.—Winchell and Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 111.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 498.—Nickles, Jour. Cincinnati Soc. Nat. Hist., 20, 1902, p. 68.

*Climacograptus putillus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 415–419, pl. 28, figs. 14, 15, text figs. 368–374, 376, 377.

*Diplograptus (Mesograptus) putillus* Ruedemann, Bull. New York State Mus., 162, 1912, p. 80.

*Diplograptus teretiusculus* var. *putillus* Roemer and Frech, Leth. Pal., 1, 1896, p. 628.

Trenton-Richmond: Maquoketa Creek, Iowa (Maquoketa); Canada; New York; Vermont; Ohio; Minnesota; etc.

*Plesiotype*.—Cat. No. 54272, U.S.N.M.

**Climacograptus (Mesograptus) putillus eximius** Ruedemann.

Cf. *Diplograptus putillus* Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1886, pp. 170, 178ff.

*Diplograptus* aff. *putillus* Ruedemann, Bull. New York State Mus., 42, 1901, p. 541.

*Climacograptus putillus* mut. *eximius* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 420, pl. 28, figs. 16, 378–384.

Chazy (Normanskill): Glenmont and Lansingburg, New York; Tartigo River, Cape Rouge, St. Lawrence region, Canada.

**Climacograptus scalaris annulatus** Ruedemann.

*Climacograptus scalaris* var. *annulatus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 421, pl. 28, fig. 32, figs. 385–387.

***Climacograptus scalaris annulatus*—Continued.**

Boulder of Clinton (?) sandstone: Aroostook, Maine.

Observation.—For bibliography of *C. scalaris* which has not been found in America, see Ruedemann, *op. cit.*, 1908, p. 421.

***Climacograptus scharenbergi* Lapworth.**

*Climacograptus scharenbergi* Lapworth, Cat. West. Scot. Foss., 1876, p. 6, pl. s, fig. 35; Rep. and Proc. Belfast Field Club, 2d ser., 1, pt. 4, 1877, p. 138, pl. 6, fig. 36.—Linnarsson, Sver. Geol. Unders. Ser. C. No. 31, 1879, p. 18.—Tullberg, *ibid.*, No. 50, 1882, p. 214.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 276; Proc. and Trans. Roy. Soc. Canada, 4, 1887, p. 180; Geol. Mag., 3d ser., 6, 1889, pl. 2.—Tornquist, Sartr. Kongl. Fys. Sallsk. Lund. Handl., IV, 1893, p. 8, pl. 1, fig. 28.—Gurley, Jour. Geol., 4, 1896, p. 298.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 609, fig. 176.—Elles Quart. Journ. Geol. Soc. London, 54, 1898, p. 519.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 541ff, pl. 1, fig. 1; 49, p. 11, pl. 3, fig. 1.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, pp. 206, 207, fig. 139; pl. 27, fig. 14.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 428–431, pl. 28, fig. 31, figs. 394–399.

Middle Ordovician slates: Great Britain and Scandinavia.

Chazy (Normarskill): New York; Canada; Tennessee; etc.

***Climacograptus spiniferus* Ruedemann.**

*Climacograptus typicalis* mut. *spinifer* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 411, 412, pl. 28, figs. 8, 9, fig. 236.

*Climacograptus spiniferus* Ruedemann, Bull. New York State Mus., 162, 1912, p. 84.

Trenton: Ballston, Saratoga, Sandy Hill., etc., New York (Canajoharie, Snake Hill, and Schenectady); Macasty Bay, Anticosti (Macasty).

Martinsburg (base): Virginia, etc.

***Climacograptus typicalis* Hall.**

*Climacograptus typicalis* Hall, Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 27, pl. A, figs. 1–9.—Hall, 20th Ann. Rep., New York State Cab. Nat. Hist., rev. ed., 1868, p. 224, pl. 2, figs. 1–9.—Zittel, Handb. Pal., 1, Munich, 1879, p. 292, fig. 197; p. 300, fig. 208 a–c.—Walcott, Trans. Albany Inst., 5, 1883, p. 10 (Advance sheets, 1879, p. 34).—Ulrich, Amer. Geology, 1, 1888, p. 183.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1892, p. 159.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 82, text, fig. 4.—Gurley, Jour. Geol., 4, p. 298.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 612.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 523.—Nickles, Jour. Cincinnati Soc. Nat. Hist., 20, 1902, p. 68.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 407–411, pl. 28, figs. 6, 7, figs. 354, 356–358, 362.

*Climacograptus typicus* Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32, fig. 51 b.

Trenton-Edea: New York, Canada, Ohio, Minnesota, etc.

*Plesiotypes*.—Cat. No. 54276, U.S.N.M.

***Climacograptus typicalis magnificus* Twenhofel.**

*Climacograptus typicalis magnificus* Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 23.

Trenton (Macasty): Macasty Bay, Anticosti.

**CLIMACOGRAPTUS TYPICALIS SPINIFER** Ruedemann. See *Climacograptus spiniferus*.



**CLIMACOGRAPTUS TYPICUS** Grabau and Shimer. See *Climacograptus typicalis*.

**Climacograptus ulrichi** Ruedemann.

*Climacograptus ulrichi* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 412, 413, pl. 28, fig. 11.

Richmond: Spencer, Missouri (Maquoketa); Oklahoma (Sylvan).

*Holotype* and *paratype*.—Cat. No. 54276, U.S.N.M.

**CLIMACOSPONGIA** Hinde.

Genotype: *C. radiata* Hinde.

*Climacospongia* Hinde, Cat. Foss. Sponges British Mus., 1883, p. 18.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 223.—Rauff, Palæontographica, 41, 1895, p. 243, footnote.

**Climacospongia radiata** Hinde.

*Climacospongia radiata* Hinde, Cat. Foss. Sponges British Mus., 1883, p. 18, pl. 1, figs. 1, 1a.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 224.

Niagara (Brownport): Perry County, Tennessee.

**CLIMACTICHNITES** Logan.

Genotype: *C. wilsoni* Logan.

*Climactichnites* Logan, Canadian Nat. Geol., 5, 1860, pp. 279–285, figs. 1–5.—Dawson, *ibid.*, 7, 1862, p. 274.—Jones, The Geologist, London, 5, 1862, pp. 138–139.—Chapman, Expos. Min. and Geol. Canada, 1864, p. 160.—Billings, Quart. Jour. Geol. Soc. London, 26, 1870, p. 485.—Chapman, Canadian Jour. Sci., 15, 1877, pp. 486–490.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, pp. 47, 99.—Todd, Trans. Wisconsin Acad. Sci., 5, 1882, pp. 276–281.—Dawson, Quart. Jour. Geol. Soc. London, 46, 1890, pp. 596 and 600.—Woodworth, Bull. New York State Mus., 69, 1903, pp. 956–966.—Clarke, Bull. New York State Mus., 80, 1905, pp. 18–20, pl. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 248.—Walcott, Smiths. Misc. Coll., 57, No. 9, 1912, p. 259, pls. 38–40.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 142.

**Climactichnites fosteri** Todd.

*Climactichnites Fosteri* Todd, Trans. Wisconsin Acad. Sci., 5, 1882, p. 280, 277, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 132, fig.

Upper Cambrian (? Ozarkian): Near New Lisbon, Wisconsin.

**Climactichnites wilsoni** Logan.

*Climactichnites Wilsoni* Logan, Canadian Nat. Geol., 5, 1860, pp. 279–285, figs. 1–5; Amer. Jour. Sci., 31, 1861, pp. 17–23, figs. 1–5.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 107, fig. 18.—Chapman, Canadian Jour., n. s., 8, 1863, p. 188, fig. 157; Expos. Min. Geol. Canada, 1864, p. 160, fig. 157.—Marsh, Proc. Amer. Assoc. Adv. Sci., 17, 1879, p. 322.—Logan, 42d Rep. New York State Mus. Nat. Hist., 1889, p. 30, figs. 1–5.—Miller, N. A. Geol. Pal., 1889, p. 538, fig. 985.—Packard, Proc. Amer. Acad. Arts and Sci., 36, 1900, p. 64.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 248.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 286, pl. 40.

Upper Cambrian or Ozarkian (Potsdam): Perth, Ontario; New York.

**Climactichnites youngi** Todd.

*Climactichnites Youngi* Todd, Trans. Wisconsin Acad. Sci., 5, 1882, p. 280, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 132, fig.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 282, pls. 38, 39.

Upper Cambrian (?Ozarkian): Near New Lisbon, Wisconsin.



**CLINOCERAS** Mascke.Genotype: *C. dens* Mascke.

*Clinoceras* Mascke, Zeits. d. d. geol. Gesell., 28, 1876, p. 49.—Zittel, Handb. Pal., 2, Munich, 1884, p. 370.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 282.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 126.

**CLINOCERAS EXIGUUM** Schuchert. See *Oncoceras exiguum*.

**Clonoceras mumiaforme** (Whitfield).

*Oncoceras mumiaforme* Whitfield, Ann. Rep. Geol. Surv. Wisconsin for 1879, 1880, p. 58; Geol. Wisconsin, 4, 1882, p. 232, pl. 7, figs. 3-5.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 159, fig.

*Clinoceras mumiaforme* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 282 (gen. ref.).—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 797, pl. 57, figs. 7-10.—Grabau and Shimer, N. A. Index Fossil, 2, 1910, p. 126, fig. 1371.

Black River (Platteville): Beloit and Janesville, Wisconsin.

**CLINOPISTHA** Meek and Worthen.Genotype: *C. lævis* Meek and Worthen.

*Clinopistha* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1870, p. 43.—Hall, Pal. New York, 5, pt. 1, Lam. 2, 1885, p. liv.—Koninck, Ann. Mus. Roy. Hist. Nat. Belgique, 11, 1885, p. 125.—Miller, N. A. Geol. Pal., 1889, p. 472.—Hind, Mon. Brit. Carb. Lamellibranchiata, 1, Pal. Soc., 1900, p. 437.

**Clinopistha antiqua** Whiteaves.

*Clinopistha?* *antiqua* Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, p. 185, pl. 20, fig. 6.

Black River or Richmond: Inmost or Birch Island, Kinnow Bay, Lake Winnipeg.

**CLINTONELLA** Hall and Clarke.Genotype: *C. vagabunda* Hall and Clarke.

*Clintonella* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 159; 13th Ann. Rep. New York State Geol., 1895, p. 814.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 759.

**Clintonella vagabunda** Hall and Clarke.

*Clintonella vagabunda* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 160, pl. 52, figs. 1-11; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 361, pl. 9, figs. 17-26; 14th Rep. State Geol. New York for 1894, 1897, p. 361, pl. 9, figs. 17-26.

Clinton (drift): Orleans County, New York.

**CLIOCINUS** Hudson. See *Cleiocrinus* Billings.

**CLIODERMA** Hall. See *Pterotheca* Koken.

**CLIONYCHIA** Ulrich.Genotype: *Ambonychia lamellosa* Hall.

*Ambonychia* Hall (part), Pal. New York, 1, 1847, p. 163.

*Cleionychia* Ulrich, Amer. Geology, 10, 1892, p. 97.

*Clionychia* Miller, N. A. Geol. Pal., 1st App. 1892, p. 699.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 493; Geol. Surv. Ohio, 7, 1893, p. 650.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 368; 2d ed., 1913, p. 445.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 979.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 435.

**Clionychia erecta** (Hall).

*Ambonychia erecta* Hall, Rep. Supt. Geol. Surv. Wisconsin, 1891, p. 32.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 59, pl. 7, figs. 1, 2.

*Clionychia erecta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 496, pl. 35, figs. 17, 18. Black River (Platteville): Beloit, Wisconsin; Minneapolis, Minnesota.

*Plesiotype*.—Cat. No. 46112, U.S.N.M.

***Clionychia excavata* Ulrich.**

*Clionychia excavata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 651, pl. 51, figs. 4, 5.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 997, pl. 44, figs. 4, 4a.

*Ambonychia excavata* Miller, N. A. Geol. Pal., 2d App., 1897, p. 779 (gen. ref.). Richmond (Whitewater): Richmond, Indiana.

*Holotype*.—Cat. No. 46113, U.S.N.M.

***Clionychia(?) gibbosa* Whiteaves.**

*Clionychia(?) gibbosa* Whiteaves, Ottawa Nat., 22, 1908, p. 109, pl. 3, figs. 5, 6. Black River (Lowville): Hog Back, Ottawa, Ontario.

***Clionychia lamellosa* (Hall).**

*Ambonychia lamellosa* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 31 (cancellosa in error).—Whitfield, Geol. Rep. Wisconsin, 4, 1882, p. 205, pl. 5, fig. 5; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 57, pl. 7, figs. 5-7.

*Clionychia lamellosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 494, pl. 35, figs. 10-14.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 435, fig. 569a.

*Ambonychia attenuata* Whitfield, Geol. Rep. Wisconsin, 4, 1882, p. 206, pl. 5, fig. 6.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 156, fig.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 59, pl. 7, figs. 8-11.

*Cleionychia attenuata* Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Black River (Platteville): Mineral Point, Beloit, Janesville, etc., Wisconsin; Minneapolis, etc., Minnesota.

*Plesiotypes*.—Cat. Nos. 46114-46116, U.S.N.M.

***Clionychia marginalis* Raymond.**

*Clionychia marginalis* Raymond, Amer. Jour. Sci., 20, 1905, p. 373.

Chazy (Day Point): Chazy and Valcour Island, New York.

***Clionychia mytiloides* (Hall).**

*Ambonychia mytiloides* Hall, Pal. New York, 1, 1847, p. 315, pl. 33, figs. 2a-b.

*Cleionychia mytiloides* Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Chazy: Chazy, New York.

***Clionychia nitida* Ulrich.**

*Clionychia nitida* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 495, pl. 35, figs. 15, 16.

Black River (Platteville): Minneapolis, Minnesota.

***Clionychia ottawaensis* Whiteaves.**

*Clionychia ottawaensis* Whiteaves, Ottawa Nat., 22, 1908, p. 108, pl. 3, fig. 4.

Black River (Lowville): Hog Back, Ottawa, Ontario.

***Clionychia rhomboidea* (Ulrich).**

*Cleionychia rhomboidea* Ulrich, Amer. Geol., 10, 1892, p. 97.

*Clionychia rhomboidea* Miller, N. A. Geol. Pal., 1st App., 1892, p. 699, fig. 1257.—

Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 496, pl. 35, figs. 19, 20.

Black River (Platteville): Minneapolis, Minnesota.

*Plastotype*.—Cat. No. 46117, U.S.N.M.

***Clionychia subundata* Ulrich.**

*Clionychia subundata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 651, fig.

*Ambonychia subundata* Miller, N. A. Geol. Pal., 2d App., 1897, p. 779 (gen. ref.).

Trenton (Upper): Mouth of Licking River, Covington, Kentucky.

*Holotype*.—Cat. No. 46118, U.S.N.M.



**Clionychia superba** (Billings).

*Ambonychia superba* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 50, fig. 16.

*Cleionychia?* *superba* Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Gamachian (Ellis Bay): Junction Cliff, Anticosti.

*Plastotype*.—Cat. No. 46910, U.S.N.M.

**Clionychia undata** (Emmons).

*Pterinea undata* Emmons, Geol. Rep. New York, 2, 1842, p. 395, fig. 1.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 369, fig. 1; p. 366, fig.

*Ambonychia undata* Hall, Pal. New York, 1, 1847, p. 165, pl. 36, figs. 7a-b.—Hitchcock, Geol. Vermont, 1, 1861, p. 296, fig. 205.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 23, fig.

*Cleionychia undata* Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

*Clionychia undata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 497, pl. 35, figs. 21, 22.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 435, fig. 569b.

*Posidonomya subundata* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 177, pl. 13, figs. 23, 25.

Trenton: Watertown, etc., New York; Fillmore and Goodhue Counties, Minnesota (Prosser).

*Plesiotype*.—Cat. No. 46119, U.S.N.M.

**CLIOPTERIA** Williams.

Genotype: *Cliopecteria bicostata* Williams.

*Cliopecteria* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 391.

**Cliopecteria bicostata** Williams.

*Cliopecteria bicostata* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 392, pl. 50, figs. 1, 2, 7.

Silurian (Pembroke): Youngs Cove, Washington County, Maine.

*Cotypes*.—Cat. No. 58441, U.S.N.M.

**Cliopecteria uncosta** Williams.

*Cliopecteria uncosta* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 393, pl. 50, figs. 3, 4, 6.

Silurian (Pembroke): Youngs Cove, Washington County, Maine.

*Cotypes*.—Cat. No. 58442, U.S.N.M.

**CLISIOPHYLLUM** Dana.

Genotype: *C. danaanum* Edwards and Haime.

*Clisiophyllum* Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, 1846, p. 361, pl. 26, figs. 6, 7; Amer. Jour. Sci. and Arts, 2d ser., 1, 1846, p. 187, fig. 2.—Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. d'Hist. Nat., 5), 1851, pp. 170, 409.—Billings, Canadian Jour., n. s., 4, 1859, p. 128.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 402.—Dybowski, Archiv. f. Nat. Liv-, Ehst- und Kurl., 5, 1873, p. 338.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 20.—Thomson and Nicholson, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 71, fig. E.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 110.—Zittel, Handb. Pal., 1, p. 232.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 384.—Hall, 12th Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 299.—Miller, N. A. Geol. Pal., 1889, p. 179.—Koken, Die Leitfossilien, Leipzig, 1896, p. 309.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 173.

**CLISIOPHYLLUM AUSTINI** Houghton. See *Acervularia austini*.

**Clisiophyllum danaanum** Edwards and Haime.

*Clisiophyllum danaanum* Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 412.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 404.

Silurian: Perry County, Tennessee.



**CLISOSPIRA** Billings.Genotype: *C. curiosa* Billings.

*Clisospira* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 186.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 307.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage, 6, 1889, p. 435.—Miller, N. A. Geol. Pal., 1889, p. 400.—Koken, Bull. Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 199.

***Clisospira bassleri*** Raymond.

*Clisospira bassleri* Raymond, Ann. Carnegie Mus., 4, 1908, p. 214, pl. 54, figs. 16, 17. Chazyan (Day Point?): Isle La Motte, Vermont.  
*Holotype*.—Cat. No. 53631, U.S.N.M.

***Clisospira curiosa*** Billings.

*Clisospira curiosa* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 186, fig. 167, p. 420, App., fig. 401, a, b.—Miller, N. A. Geol. Pal., 1889, p. 400, fig. 661.  
*Clisospira curiosa* Clarke, Amer. Geol., 13, 1894, p. 331.  
Canadian (Beekmantown): Near St. Antonie, above Quebec, Canada.

***Clisospira lirata*** Whitfield.

*Clisospira lirata* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 308, pl. 24, figs. 16, 17.  
*Clisospira* (*Onychocheilus*?) *lirata* Clarke, Amer. Geology, 13, 1894, p. 331.  
*Clisospira lirata* Seely, Rep. State Geol. Vermont, 7, 1910, pl. 62, figs. 16, 17.  
Canadian (Beekmantown): Fort Cassin, Vermont.

***Clisospira occidentalis*** Whitfield.

*Clisospira occidentalis*, Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 75; Geol. Wisconsin, 4, 1882, p. 222, pl. 5, fig. 21.  
*Clisospira occidentalis* Clarke, Amer. Geol., 13, 1894, p. 331.  
Black River (Platteville): Beloit, Wisconsin.

**CLITAMBONITES** Pander.Genotype: *Pronites adscendens* Pander.

*Klitambonites* Pander, Beitrage zur Geognosie des Russischen Reiches, 1830, p. 70, pl. 3, fig. 14; pl. 28, figs. 16, 17.  
*Clitambonites* (Ehlert, Fischer's Manuel de Conchyliologie, 1887, p. 1289, fig. 1059.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 233.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 687.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 377.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 274.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 320; 2d ed., 1913, p. 392.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 270.  
*Orthisina* D'Orbigny, Compt. Rend. de l'Acad. Sci., 25, 1847, p. 267; Prod. Pal., 1, 1849, p. 16.—Davidson, British Foss. Brach., Pal. Soc., 1853, p. 104.—Woodward, Man. Mollusca, pt. 2, 1854, p. 230, fig. 148.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 57.—Chapman, Canadian Jour., n. s., 3, 1868, p. 160.—Pahlen, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 24, No. 8, 1877, p. 7.—Zittel, Handb. Pal., 1, 1880, p. 676.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1884, p. 576.—Miller, N. A. Geol. Pal., 1889, p. 360.—Koken, Die Leitfossilien, Leipzig, 1896, p. 234, fig. 194, p. 408.—Huene, Verh. d. Russ.-Kais. Min. Gesell. zu St. Petersburg, 2d ser., 38, 1896, p. 224.

***Clitambonites adscendens*** (?Pander).

*Orthisina adscendens* (Pander) Kayser, Paleontographica, Suppl., 3, 1876, p. 20, pl. 2, figs. 9-11.  
Ordovician: Europe; Juan Pobre and Laja, Cordillera San Juan, Argentina.

**CLITAMBONITES AMERICANUS** Hall and Clarke. See *Clitambonites diversus*.

**CLITAMBONITES AMERICANUS** var. Hall and Clarke. See *Clitambonites diversus altissimus*.

**Clitambonites(?) borealis** (Castelnau).

*Terebratula borealis* Castelnau, Essai Syst. Sil. l'Amérique Septent., 1843, p. 40, pl. 14, fig. 14.

*Terebratula turpis* de Verneuill, *ibid.* 1843, p. 40, footnote.

*Clitambonites(?) borealis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 183.

"Magnesian limestone of Green Bay, Wisconsin."

Observation.—The figure is not satisfactory. The species seems to be related to *C. diversus* Shaler (Schuchert).

**Clitambonites diversus** (Shaler).

*Orthisina diversa* Shaler, Bull. Mus. Comp. Zool., 1, 1865, p. 67.

*Orthisina verneuilli* Billings (not Eichwald), Cat. Sil. Foss. Anticosti, 1866, pp. 43, 74.

*Clitambonites diversa* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 378, pl. 30, figs. 11–17.—Whiteaves, Pal. Foss., 3, pt. 3, Geol. Surv. Canada, 1897, p. 166.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 270, figs. 324e–g.

*Orthisina (Clitambonites) diversa* Huene, Verh. d. Russ. Kais. Mineral Gesell. zu St. Petersburg, 2d ser., 38, 1900, p. 225, fig. 2.

*Hemipronites, americanus* Whitfield, Ann. Rep. Geol. Surv. Wisconsin, 1877, p. 72; Geol. Wisconsin, 4, 1882, p. 243, pl. 10, figs. 15–17.

*Streptorhynchus americanus* Miller, N. A. Geol. Pal., 1889, p. 378.

*Clitambonites americanus* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 239, pl. 15A, figs. 1–8.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 94, pl. 4, figs. 14–19.

Trenton and Richmond: Island of Anticosti (Charleton and Ellis Bay); Oshkosh, Wisconsin; Cannon Falls, etc., Minnesota; Ontario; Manitoba; Snake Hill, New York.

Observation.—Probably two species are included in the above citations, but the types of both *C. diversus* and *C. americanus* are from the Richmond.

**Clitambonites diversus altissimus** Winchell and Schuchert.

*Clitambonites americanus* var. Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 15A, figs. 7, 8.

*Clitambonites diversa* var. *altissima* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 381, pl. 30, figs. 18, 19.

Trenton (Prosser): Near Cannon Falls, Minnesota.

**CLITAMBONITES DIVERSUS-ROGERSSENSIS** Foerste. See *Clitambonites rogersensis*.

**CLITAMBONITES(?) JOHANNENSIS** Schuchert. See *Eoorthis johannensis*.

**Clitambonites multicostus** (Hudson).

*Syntrophia multicosta* Hudson, Bull. New York State Mus., 80, 1903, p. 285, pl. 5, figs. 8–15.

*Clitambonites multicostus* Raymond, Ann. Carnegie Mus., 7, 1911, p. 247, fig. 23; pl. 36, figs. 10–14.

Chazy (Valcour): Eastern side of Valcour Island, Bluff Point, and Chazy, New York.

**Clitambonites multistriatus** Foerste.

*Clitambonites multistriata* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 131, pl. 10, fig. 12.

Trenton (Perryville): Near Danville, Kentucky.

**CLITAMBONITES PIGER** Schuchert and Twenhofel. See *Orthis(?) piger*.



**Clitambonites planus retroflexus** (Verneuil).

Gonambonites plana var. retroflexa Verneuil, Beitr. zur Geog. Russ. Reiches, 1830, p. 77, pl. 25, figs. 1, 2.

Clitambonites (Gonambonites) plana var. retroflexa Matthew, Trans. Roy. Soc. Canada, 2d ser., 1, 1896, p. 266, pl. 2, figs. 1a-1c.

Canadian (Bretonian): McFeel, Cape Breton, Nova Scotia.

**Clitambonites porcia** (Billings).

Orthis porcia Billings, Canadian Nat. Geol., 4, 1859, p. 439, figs. 16-18; Geol. Canada, Geol. Surv. Canada, 1863, p. 130, fig. 58.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 531, figs.

Clitambonites porcia Raymond, Ann. Carnegie Mus., 7, 1911, p. 248, pl. 36, figs. 15, 16.

Chazyan (Aylmer): Two miles south of Montreal, Quebec.

**Clitambonites rogersensis** (Foerste).

Clitambonites diversus-rogersensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 323, pl. 7, figs. 14a, b.

Clitambonites rogersensis Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 69; Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 132, pl. 2, figs. 6a-d.

Trenton (Upper): Rogers Gap and north of Ford, Kentucky.

**CLONOGRAPTUS** Nicholson. See *Clonograptus* Hall.**CLONOGRAPTUS** Hall.

Genotype: *Graptolithus rigidus* Hall.

*Clonograptus* Hall in Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 138.

*Clonograptus* Zittel, Handb. Pal., 1, 1879, p. 299.—Herman, Geol. Mag., dec. 3, 3, 1886, p. 24.—Barrois, Ann. Soc. Geol. Nord, 21, 1893, p. 108.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 265.—Koken, Die Leitfossilien, 1896, p. 416.—Roemer and Frech, Leth. geog., 1 Theil Leth. Pal., 1, 2 Lief, 1897, p. 598.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 472.—Elles and Wood, Mon. British Graptolites, Pal. Soc., 1902, p. 82.

**Clonograptus abnormis** (Hall).

*Graptolithus abnormis* Hall, Canadian Nat. Geol., 3, 1858, p. 144; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 117; Pal. New York, 3, 1859, p. 503; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 51; Geol. Surv., Canada, dec. 2, 1865, p. 106, pl. 11, fig. 6.

*Graptolithus* (Monoprion) *abnormis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed., 1870, pp. 223, 261.

*Clonograptus abnormis* Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 51 (gen. ref.).

*Dichograptus abnormis* Gurley, Jour. Geol., 4, 1896, pp. 65, 95 (gen. ref.).

Canadian (Levis): Point Levis, Quebec.

**Clonograptus flexilis** (Hall).

*Graptolithus flexilis* Hall, Geol. Surv. Canada, Rep. for 1857, 1858, pp. 119, 145.—Billings, Geol. Canada, Geol. Surv. Canada, 1868, p. 228, fig. 235.—Hall, Geol. Surv. Canada, dec. 2, 1865, p. 11, fig. 8; p. 103, pl. 10, figs. 3-9.

*Dichograptus flexilis* Nicholson, Mon. British Graptolites, 1872, p. 108, fig. 51.—Gurley, Jour. Geol., 4, 1896, p. 95.

*Graptolithus* (Dichograptus) *flexilis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 176, fig. 9; p. 226, pl. 3, figs. 28, 29; rev. ed., 1870, p. 209, fig. 9, pl. 3, figs. 28, 29.

*Graptolithus* (Monoprion) *flexilis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 223.



**Clonograptus flexilis**—Continued.

- Clonograptus flexilis* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 138 (gen. ref.).
- Clonograptus flexilis* Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 97.—Pritchard, Proc. Royal Soc. Victoria, n. s., 7, 1895, p. 29.—Roemer, Leth. geog., 1 Theil., Leth. Pal., 1, 3 Lief., 1897, p. 599, fig. 164.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 473.—T. S. Hall, Proc. Soc. Victoria, n. s., 11, 1898, p. 169, pl. 19, fig. 20.
- Clonograptus cf. flexilis* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 618.
- Canadian: Point Levis, Quebec (*Levis*, *Clonograptus* zone); St. John, New Brunswick (*Bretonian*, Div. C 3d); near Defreestville, Rensselaer County, New York (*Deepkill*); Victoria.

**Clonograptus milesi** (Hall).

- Graptolithus milesi* Hall, Geol. Vermont, 1, 1861, p. 372; 2, pl. 12, figs. 2-4; Geol. Surv. Canada, dec. 2, 1865, p. 20, fig. 27; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 188, fig. 29; p. 226; rev. ed., 1870, p. 217, fig. 29.
- Graptolithus* (*Monoprion*) *milesi* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 223.
- Dichograptus* (*Graptolithus*) *milesi* Nicholson, Mon. Brit. Grapt., 1872, p. 65, fig. 34.
- Temnograptus milesi* Nicholson, Geol. Mag., dec. 2, 3, 1876, p. 248 (gen. ref.).
- Clonograptus milesi* Ruedemann, Bull. New York State Mus., 69, 1903, p. 939; Mem. New York State Mus., 7, 1904, p. 617 and footnote.
- Canadian (*Levis*): Monckton, Vermont.

**CLONOGRAPTUS PROXIMATUS** Matthew. See *Staurograptus dichotomus*.

**Clonograptus remotus** (Gurley).

- Dichograptus remotus* Gurley, Jour. Geol., 4, 1896, p. 64.
- Clonograptus remotus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 133 (gen. ref.).
- Canadian (*Levis*): Point Levis, Quebec.

**CLONOGRAPTUS RICHARDSONI** Elles and Wood. See *Holograptus richardsoni*.

**Clonograptus rigidus** (Hall).

- Graptolithus rigidus* Hall, Canadian Nat. Geol., 3, 1858, p. 146; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 121; Geol. Surv. Canada, dec. 2, 1865, p. 105, pl. 11, figs. 1-5.
- Graptolithus* (*Monoprion*) *rigidus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed., 1870, pp. 223, 261.
- Dichograptus rigidus* Gurley, Jour. Geol., 4, 1896, p. 95 (gen. ref.).
- Clonograptus rigidus* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 138 (gen. ref.).—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 599.—T. S. Hall, Proc. Royal Soc. Victoria, n. s., 11, 1898, p. 170, pl. 18, fig. 22; pl. 19, fig. 21.—Elles and Wood, Mon. Brit. Grapt. Pal. Soc., 1903, p. 51 (gen. ref.).
- Canadian (*Levis*, *Clonograptus* zone): Point Levis, Quebec. Lower Ordovician slates of Victoria.

**Clonograptus? spinosus** Matthew.

- Clonograptus* (?) *spinosus* Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 97, pl. 7, figs. 2 a, b.
- Canadian (*Bretonian*, Div. C 3b): Navy Island, New Brunswick.
- Observation.—Possibly same as *Staurograptus dichotomus* Emmons.

**CLORINDA** Barrande.Genotype: *C. armata* Barrande.

*Clorinda* Barrande, Syst. Sil. Boheme, 5, pt. 1, 1879, p. 109, pl. 119; Brach. Ext. Syst. Sil. Centre Boheme, 5, 1879, p. 172.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 322.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 276.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 395.

*Barrandella* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, pp. 241, 243; Ann. Rep. New York State Geol., 1895, p. 844.—Grabau, Bull. New York State Mus., 45, 1901, p. 191; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 191.

***Clorinda arcuosa*** (McChesney).

*Pentamerus arcuosus* McChesney, Descriptions New Pal. Foss., 1861, p. 87.

*Clorinda arcuosa* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184

Niagaran (Racine): Milwaukee, Wisconsin.

***Clorinda areyi*** (Hall and Clarke).

*Barrandella areyi* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pp. 242, 368, pl. 71, figs. 14–16; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 369, pl. 13, figs. 1–3; 14th Rep. State Geol. New York for 1894, 1897, p. 369, pl. 13, figs. 1–3.

*Clorinda areyi* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184.

Clinton: Rochester, New York.

*CLORINDA BARRANDEI* Schuchert. See *Virgiana barrandei*.

***Clorinda fornicata*** (Hall).

*Pentamerus fornicatus* Hall, Pal. New York, 2, 1852, p. 81, pl. 24, fig. 7.

*Pentamerus fornicatus* var. Hall, Desc. n. sp. Fossils, Waldron, Indiana, 1879, p. 16; 11th Rep. State Geol. Indiana, 1882, p. 299, pl. 27, fig. 15; Trans. Albany Inst., 10, 1883, p. 72.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 616, figs.

*Barrandella fornicata* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 243, pl. 70, figs. 11–13.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 191, fig. 104; Bull. New York State Mus., 45, 1901, p. 191, fig. 104.

*Clorinda fornicata* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184.

*Clorinda* (*Barrandella*) *fornicata* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 276, fig. 335.

Niagaran: Lockport, New York (Clinton-Irondequoit); Waldron, Indiana (Waldron); Wisconsin.

***Clorinda? thebesensis*** Savage.

*Clorinda? thebesensis* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 79, pl. 5, figs. 7, 8.

Upper Medinan (Edgewood): Near Thebes, Illinois; Louisiana; and near Clarks-ville, Pike County, Missouri (Noix oolite).

***Clorinda ventricosa*** (Hall).

*Pentamerus ventricosa* Hall, Geol. Surv. Wisconsin, Rep. Prog., 1860, p. 2.—Whitfield, Geol. Wisconsin, 4, 1882, p. 291, pl. 17, figs. 11–13.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 192, fig.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Surv., 1889, p. 64, pl. 33, figs. 12–14.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 619, 2 figs.

*Pentamerus chicagoensis* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 94, pl. 2, fig. 11.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 392.

*Pentamerus* (*Pentamerella?*) *ventricosa* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 374, pl. 13, figs. 18–21.



**Clorinda ventricosa**—Continued.

*Pentamerus* (*Pentamerella*) *ventricosus* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 138, pl. 7, figs. 7, 8.

*Pentamerus* (*Barrandella*) *ventricosus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 65.

*Barrandella ventricosa* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 243, pl. 71, figs. 4–10; pl. 84, fig. 46.

*Clorinda* (*Barrandella*) *ventricosa* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 276, fig. 336a–b.

*Clorinda ventricosa* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 185.

Niagaran: Waukesha, Wisconsin; Bridgeport, Illinois (Racine); Louisville, Kentucky; Ohio.

*Plesiotype*.—Cat. No. 51323 (Nettelroth).

**CLOSTEROCRINUS** Hall.

Genotype: *C. elongatus* Hall.

*Closteroocrinus* Hall, Pal. New York, 2, 1852, p. 179.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 329.—Miller, N. A. Geol. Pal., 1889, p. 232.—Bather, *Treatise on Zool.* (Lankester), pt. 3, 1900, p. 173.

**Closteroocrinus elongatus** Hall.

*Closteroocrinus elongatus* Hall, Pal. New York, 2, 1852, p. 179, pl. A 41, figs. 2a–f.

Clinton (Irondequoit): Lockport, New York.

CNEMIDIUM? TRENTONENSIS Worthen. See *Zittellella trentonensis*.

**COCCOCCRINUS** Müller.

Genotype: *C. rosaceus* Roemer.

*Coccocrinus* Müller, in Zeiler and Wirtgen, *Verh. Naturh. Verein Rheinl.*, 12, 1855, p. 20.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 310.—Roemer, *Sil. Fauna West. Tennessee*, 1860, p. 51.—Dujardin and Hupé *Hist. Nat. Zooph.*, 1862, p. 107.—Allman, *Trans. Royal Soc. Edinburgh*, 23, 1864, p. 248, fig. 3.—Schultze, *Denk. d. Kais. Akad. der Wiss., Math.-Naturw.*, Cl. 26, Abth. 2, 1867, p. 200, fig. 16.—Zittel, *Handb. d. Pal.*, 1, 1879, p. 347.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, p. 232. (*Rev. Pal.*, pt. 2, p. 58); 1886, pp. 280, 336 (*Rev. Pal.*, pt. 3, pp. 58, 114); 1887, pp. 97–113; *ibid.*, 1890, pp. 351, 355.—Neumayr, *Stämme des Thierreicher*, 1889, p. 470.—Miller, N. A. Geol. Pal., 1889, p. 232.—Bather, *Geol. Mag.*, dec. 4, 4, 1897, p. 343.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool.*, Harvard, 21, 1897, p. 738.—Bather, *Treatise on Zool.*, pt. 3, *Echinoderma*, 1900, p. 156.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 149.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 515.—Springer, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 199.

**Coccocrinus bacca** Roemer.

*Coccocrinus bacca* Roemer, *Sil. Fauna West. Tennessee*, Breslau, 1860, p. 51, pl. 4, figs. 5a, 5b, 5c.—Miller, N. A. Geol. Pal., 1889, p. 232, fig. 265.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool.*, Harvard, 21, 1897, p. 739, pl. 75, fig. 15.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 29, pl. 4, fig. 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 515, fig. 1835.

*Platycrinites Ann Dixoni* Troost, *Amer. Jour. Sci. and Arts*, 2d ser., 8, 1849, p. 420 (nom. nud.); *Proc. Amer. Assoc. Adv. Sci.*, 2, 1850, p. 61.

Niagaran (Brownsport): Perry and Decatur Counties, Tennessee.

*Plesiotype*.—Cat. No. 39888, U.S.N.M. (Troost's type of *P. Ann Dixoni*).

**Coccocrinus conicus** (Troost).

*Coccocrinus conicus* (*Cupellacrinites conicus* Troost MS. 1850) Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 29, pl. 15, fig. 1.

Niagaran (Brownsport): Decatur County, Tennessee.

*Holotype*.—Cat. No. 39933, U.S.N.M.



**CODASTER OSGOODENSIS** Wachsmuth and Springer. See *Stephanocrinus osgoodensis*.

**CODASTER PENTALOBUS** Hall. See *Stephanocrinus pentalobus*.

**CODASTER PULCHELLUS** Miller and Dyer. See *Stephanocrinus pulchellus*.

**CODONOCHEILUS** Whiteaves. Genotype: *C. striatum* Whiteaves.

*Codonocheilus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 17.

*Codonochilus* Miller, N. A. Geol. Pal., 1889, p. 400.

**Codonochilus striatum** Whiteaves.

*Codonocheilus striatum* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 17, pl. 3, fig. 3.

*Codonochilus striatum* Fischer, Man. de Conchyl., 1885, pp. 832, 833.—Miller, N. A. Geol. Pal., 1889, p. 400, fig. 662.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 93.

Niagaran (Guelph): Hespeler and Durham, Ontario.

**CŒLASTER AMERICANUS** D'Orbigny. See *Petraster americana*.

**CŒLASTER MATUTINA** D'Orbigny. See *Hudsonaster matutina*.

**CŒLIDIUM** Clarke and Ruedemann. See *Cœlocaulus* Œhlert.

**CŒLOCAULUS** Œhlert. Genotype: *Murchisonia* (*Cœlocaulus*) *dauidsoni* Œhlert.

*Murchisonia* (part) Lindstrom, Billings, and other authors.

*Cœlocaulus* (new subgenus of *Murchisonia*) Œhlert, Bull. Soc. d'Etudes Sci. d'Angers, 7, 1888, p. 84.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 371.—Donald, Quart. Jour. Geol. Soc. London, 48, 1892, p. 572; 51, 1895, p. 211.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 959–1019.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 20.

*Cœlidium* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 65.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652.

**Cœlocaulus bivittatus** (Hall).

*Murchisonia bivittata* Hall, Pal. New York, 2, 1852, p. 345, pl. 83, fig. 1a, b.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 339, fig. 343.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, figs. 7 (not fig. 8); Quart. Jour. Geol. Soc. London, 31, 1875, p. 546, pl. 26, fig. 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 427, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 82, pl. 12, figs. 5, 6.

*Murchisonia* (*Cœlocaulus*) *bivittata* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 462, pl. 13, fig. 4.

*Cœlocaulus bivittatus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Niagaran: Galt, Ontario (Guelph); Huntington, Indiana.

*Plesiotype*.—Cat. No. 52948, U.S.N.M.

**Cœlocaulus estella** (Billings).

*Murchisonia Estella* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 157, fig. 139.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, p. 368.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 11, 1895, p. 83.

*Cœlocaulus estella* Whiteaves, *ibid.*, 3, pt. 4, 1906, p. 334 (gen. ref.).

Niagaran (Guelph): Galt, Ontario.

Observation.—Probably the same as *C. turritiformis* (Hall).

**Cœlocaulus linearis** (Billings).

*Murchisonia linearis*, Billings, Canadian Nat. Geol., 4, 1859, p. 359, fig. 8g; Geol. Canada, Geol. Surv. Canada, 1863, p. 119, fig. 31.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 429, fig.

**Coelocaulus linearis**—Continued.

*Coelocaulus linearis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

*Coelidium linearis* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652.  
Chazy (Mingan): Mingan Islands, Canada.

**COELOCAULUS LOGANI** Hall. See *Coelocaulus macrospira*.

**Coelocaulus longispira** (Hall).

*Murchisonia longispira* Hall, Pal. New York, 2, 1852, p. 345, pl. 83, fig. 2a, b.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, figs. 11, 12; Quart. Jour. Geol. Soc. London, 31, 1875, p. 546, pl. 26, figs. 11, 12.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 83.

*Coelocaulus longispira* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Niagaran (Guelph): Galt, Ontario; Wisconsin.

**Coelocaulus macrospira** (Hall).

*Murchisonia macrospira* Hall, Pal. New York, 2, 1852, p. 346, pl. 83, fig. 5.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 339, fig. 334.—Nicholson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 545, pl. 26, fig. 9; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, fig. 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 27, pl. 4, figs. 7, 7a.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 429, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 81.

*Coelidium macrospira* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 65, pl. 7, figs. 2-8; pl. 10, fig. 13.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652, fig. 892.

*Coelocaulus macrospira* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 333 (gen. ref.).

*Murchisonia loganii* Hall, Pal. New York, 2, 1852, p. 346, pl. 84, figs. 4a, b.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, figs. 3, 4; Quart. Jour. Geol. Soc. London, 31, 1875, p. 544, pl. 26, figs. 3, 4.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 80.

*Coelocaulus logani* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Niagaran (Guelph): Galt, Ontario; Shelby and Rochester, New York; Wisconsin.

**Coelocaulus neglectus** Ulrich and Scofield.

*Coelocaulus neglectus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020, pl. 82, figs. 29-31.

Trenton (Prosser): Near Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 45749, U.S.N.M.

**Coelocaulus obtusus** (Hall).

*Murchisonia? obtusa* Hall, Pal. New York, 2, 1852, p. 333, pl. 76, fig. 3.

Cayugan (Cobleskill): Schoharie, New York.

**Coelocaulus cehlerti** Ulrich and Scofield.

*Coelocaulus cehlerti* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020, pl. 70, figs. 61-63.

*Coelidium cehlerti* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652, fig. 893 a, b.

*Murchisonia cehlerti* Miller, N. A. Geol. Pal., 2d App., 1897, p. 768 (gen. ref.).

Trenton (Galena): Jo Daviess County, Illinois.

*Cotypes*: Cat. No. 45750, U.S.N.M.



***Cœlocaulus petila* (Hall and Whitfield).**

*Murchisonia petila* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 186; 27th Rep., 1875, p. 186, pl. 13, fig. 8.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 170, pl. 31, fig. 5.  
Niagaran (Louisville): Falls of the Ohio.

***Cœlocaulus terebralis* (Hall).**

*Murchisonia? terebralis* Hall, Pal. New York, 2, 1852, p. 334, pl. 76, fig. 4.  
Cayugan (Cobleskill): Schoharie, New York.

***Cœlocaulus turritiformis* (Hall).**

*Murchisonia turritiformis* Hall, Pal. New York, 2, 1852, p. 347, pl. 83, fig. 6a, b.—Nicholson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 545, pl. 26, fig. 10; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, fig. 10.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 26, pl. 4, fig. 5; pt. 2, 1895, p. 84, pl. 12, fig. 4.  
*Cœlocaulus turritiformis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).  
Niagaran (Guelph): Galt, Ontario; Wisconsin.  
Observation.—See *C. estella* (Billings) for a probable synonym.

***Cœlocaulus vitellia* (Billings).**

*Murchisonia Vitellia* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 156, fig. 138 (adv. sheets 1862).—Nicholson, Quart. Jour. Geol. Soc. London, 30, 1875, p. 547, pl. 26, fig. 6; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 71, pl. 3, fig. 6.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 80.  
*Cœlidium* cf. *vitellia* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 67, pl. 7, figs. 9, 10.  
*Cœlocaulus*(?) *Vitellia* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 333 (gen. ref.).  
Niagaran (Guelph): Galt, Ontario; Rochester, New York.

***Cœloclema* Ulrich.**

Genotype: *Diamesopora vaupeli* Ulrich.

*Cœloclema* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 137; 7, 1884, p. 49 (not defined).—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 24, 211.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 21.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 83; Zittel-Eastman Textb. Pal., 1913, p. 328.  
*Diamesopora* (part) Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 467; Geol. Minnesota, 3, 1893, p. 330; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.

***Cœloclema alternatum* (James).**

*Ceramopora alternata* James, Paleontologist, No. 1, 1878, p. 5.  
*Monticulipora* (*Fistulipora*) *alternata* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 34, pl. 1, figs. 5–5b.  
*Diamesopora vaupeli* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 468, pl. 39, figs. 3, 3b; pl. 41, figs. 4–4c.  
*Cœloclema alternatum* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 211.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 33.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 803, pl. 12, figs. 2–2d; pl. 27, fig. 16.  
Eden (Southgate and McMicken): Cincinnati, Ohio, and vicinity.  
*Plesiotypes*.—Cat. No. 43292, U.S.N.M. (cotypes of *D. vaupeli*).



**Cœloclema cavernosum** Bassler.

*Cœloclema cavernosa* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 21, pl. 23, figs. 10-13.

Clinton: Lockport, New York (Rochester); Osgood, Indiana (Osgood).

*Cotypes*.—Cat. No. 35471, U.S.N.M.

**Cœloclema commune** (Ulrich).

*Diamesopora communis* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 469, pl. 39, 3a, pl. 41, figs. 5, 5b.

*Cœloclema concentricum* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 212 (not *Ceramopora concentrica* James).

*Cœloclema commune* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 804, pl. 12, figs. 3, 3c; pl. 27, fig. 17.

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 43293, U.S.N.M.

**CœLOCLEMA CONCENTRICUM** Nickles and Bassler. See *Cœloclema commune*.

**CœLOCLEMA IMBRICATA** Ulrich. See *Diamesopora subimbricata*.

**CœLOCLEMA INFREQUENS** Ulrich. See *Diamesopora infrequens*.

**CœLOCLEMA OSCULUM** Ulrich. See *Diamesopora osculum*.

**Cœloclema oweni** (James).

*Fistulipora oweni* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 21, figs. 2-2g.

*Monticulipora* (*Fistulipora*) *oweni* James and James, *ibid.*, 11, 1888, p. 34.—J. F. James, *ibid.*, 18, 1896, p. 119.

*Diamesopora oweni* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.

*Cœloclema oweni* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 212 (gen. ref.).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 34, pl. 6, figs. 5, 6.

Maysville (Mount Auburn): Lebanon, Cincinnati, etc., Ohio; Indiana; Kentucky.

**Cœloclema trentonense** (Ulrich).

*Diamesopora trentonensis* Ulrich, Geol. Minnesota, 3, 1893, p. 330, pl. 28, fig. 14; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268, fig. 439.

*Cœloclema trentonense* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 212 (gen. ref.).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122, fig. 178.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 463.

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

Trenton: St. Paul, etc., Minnesota (Prosser); Trenton Falls, New York; Ottawa, Ontario.

*Cotypes*.—Cat. No. 43294, U.S.N.M.

**CœLOCYSTIS** Schuchert.

Genotype: *Hemicosmites subglobosus* Hall.

*Hemicosmites* Hall (not Von Buch), 20th Rep. New York State Cab. Nat. Hist., rev. ed., 1868, p. 359.

*Sphaerocystites* Jaekel (not Hall), Stammesg. Pelmat., 1, 1899, p. 289, fig. 63; p. 307.

*Cœlocystis* Schuchert, Amer. Geol., 32, 1903, p. 234; Smiths. Misc. Coll., 47, 1904, p. 246.

**Cœlocystis subglobosus** (Hall).

*Hemicosmites subglobosus* Hall, 25th Rep. New York State Cab. Nat. Hist., 1868, (extras Dec., 1864), p. 316, pl. 12 (3), fig. 13; rev. ed., 1868 (1870), p. 359, pl. 12, fig. 13.

**Cœlocystis subglobosus**—Continued.

*Sphaerocystites dolomiticus* Jaekel, Stammesg. Pelmat., 1, Thecoidea u. Cystoidea, 1899, p. 289, fig. 63.

*Cœlocystis subglobosus* Schuchert, Amer. Geol., 32, 1903, p. 235; Smiths. Misc. Coll., 47, 1904, p. 248, figs. 36, 37.

Niagara (Racine): Racine, Wisconsin; Chicago, Illinois.

*Plesiotypes*.—Cat. Nos. 35061, 35155, U.S.N.M.

**CÆLOSPIRA** Hall.

Genotype: *Leptocœlia concava* Hall.

*Cœlospira* Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 59; Trans.

Albany Inst., 4, 1863, p. 146; Pal. New York, 4, 1867, p. 328.—Hall and

Clarke, Pal. New York, 8, pt. 2, 1893, p. 134, figs. 122, 123.—Davidson, Mon.

British Foss. Brach., 5, Sil. Suppl., Pal. Soc., 1882, p. 84.—Miller, N. A.

Geol. Pal., 1889, p. 340.—Koken, Die Leitfossilien, Leipzig, 1896, p. 241.—

Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 338; 2d ed., 1913, p. 338.

*Leptocœlia* Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 108; 12th

Rep., 1859, p. 32, figs. 1, 2, 4; Pal. New York, 3, 1859, p. 447.—Billings,

Canadian Jour., 6, 1861, p. 351.—Hall, Amer. Jour. Sci., 36, 1863, p. 14.—

Rominger, Amer. Jour. Sci., 35, 1863, p. 84.—Hall, Trans. Albany Inst., 4,

1863, p. 145; Pal. New York, 4, 1867, p. 365.—Davidson, Mon. British

Sil. Brach., Pal. Soc., 1867, p. 138, footnote.—Dall, Amer. Jour. Conch., 6,

1870, p. 98, footnote; 7, 1871, p. 60.—Zittel, Handb. Pal., 1, 1880, p. 704.—

Davidson, Mon. British Foss. Brach., 5, App. to Suppl., Pal. Soc., 1884, p.

365.—Miller, N. A. Geol. Pal., 1889, p. 348.—Nettleroth, Kentucky Fossil

Shells, Mem. Geol. Surv. Kentucky, 1889, p. 151.—Hall and Clarke, Pal.

New York, 8, pt. 2, 1893, p. 136.—Ulrich, Neues Jahrb. f. Min., Geol., Pal.

Beilage-Band, 8, 1893, p. 60.—Koken, Die Leitfossilien, Leipzig, 1896, p.

249.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 417. (Subgenus of

*Cœlospira*; genotype *L. flabellites* Hall.)

*Anoplothea* Grabau, Bull. New York State Mus., 45, 1901, p. 205; Bull. Buffalo

Soc. Nat. Sci., 7, 1901, p. 205.—Schuchert and Maynard, Maryland Geol.

Surv., Low. Dev., 1913, p. 433.

**Cœlospira concava tonolowayensis** (Swartz).

*Anoplothea concava* var. *tonolowayensis* Swartz, Maryland Geol. Surv., Low.

Dev., 1913, p. 435, pl. 73, figs. 20, 21.

Helderbergian (Keyser): Tonoloway, Maryland.

**Cœlospira congregata** (Kindle and Breger).

*Anoplothea congregata* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res.

Indiana, 1904, p. 444, pl. 9, figs. 18–20.—Foerste, Cincinnati Soc. Nat. Hist.,

Jour., 21, No. 1, 1909, p. 20.

Cayugan (Kokomo): Logansport and Kokomo, Indiana.

**Cœlospira hemispherica** (Sowerby).

*Atrypa hemispherica* Sowerby, Murchison's Sil. Syst., 1839, p. 639, pl. 20, fig. 7.—

Hall, Pal. New York, 2, 1852, p. 74, pl. 23, fig. 10.—Billings, Geol. Canada,

1863, p. 318, fig. 337.

*Atrypa hemispherica* ? Hall, Geol. New York; Rep. Fourth Dist., 1843, p. 73,

fig. 4.

*Leptocœlia hemispherica* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859,

p. 77.—Nettleroth, Kentucky Fossil Shells, Mem. Geol. Surv. Kentucky,

1889, p. 152, pl. 32, figs. 21–23, 36–39.—Foerste, Proc. Boston Soc. Nat. Hist.,

24, 1890, p. 325, pl. 6, figs. 18, 19.

*Atrypa flabella* Shaler, Bull. Mus. Comp. Zool., 4, 1865, p. 68.



**Cœlospira hemispherica**—Continued.

*Cœlospira* ? *hemispherica* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 136, pl. 82, figs. 1-4 (? pl. 52, fig. 16).

*Anoplothea hemispherica* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 145.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 204, fig. 132; Bull. New York State Mus., 45, 1901, p. 205, fig. 132.

*Anoplothea* (*Cœlospira*) *hemispherica* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 350, fig. 455.

Silurian: England; Rochester, Sodus, and Walcott, New York; Kentucky; Tennessee; Georgia; Alabama; Nova Scotia (Clinton); The Jumpers, etc., Anticosti (Anticostian, Gun River-Chicotte).

*Plesiotype*.—Cat. No. 51322, U.S.N.M.

**Cœlospira planoconvexa** (Hall).

*Atrypa planoconvexa* Hall, Pal. New York, 2, 1852, p. 75, pl. 23, fig. 11.—Billings, Geol. Canada, 1863, p. 318, fig. 336.

*Leptocoelia planoconvexa* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 144.

*Cœlospira*? *planoconvexa* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 136, pl. 52, fig. 15; pl. 53, figs. 11-16.

*Anoplothea planoconvexa* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 145. Silurian: Flamborough Head, etc., Ontario (Cataract); Island of Anticosti (Gun River).

**Cœlospira plicatula** (Hall).

*Atrypa plicatula* Hall, Geol. New York, Rep. 4th Dist., 1843, p. 71, fig. 4; Pal. New York, 2, 1852, p. 74, pl. 23, fig. 9.

*Leptocoelia*? *plicatula* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.

*Rhynchonella plicata* Miller, N. A. Geol. Pal., 1889, p. 369.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 898, fig.

*Cœlospira*? *plicatula* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 136, pl. 52, figs. 12-14; pl. 82, fig. 5.

*Anoplothea plicatula* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 145.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 205, fig. 133; Bull. New York State Mus., 45, 1901, pp. 205, 206, fig. 133.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 350, fig. 456.

Clinton: Reynales Basin, etc., New York.

**Cœlospira saffordi** (Foerste).

*Anoplothea* (*Cœlospira*) *saffordi* Foerste, Jour. Geol., 11, 1903, p. 709.

*Anoplothea saffordi* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 89, pl. 1, fig. 6.

Niagaran (Brownsport): Near Martins Mills, Bath Springs, etc., Tennessee.

**CœNITES** Eichwald.

Genotype: *C. juniperinus* Eichwald.

*Cœnites* Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 179.—Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. d'Hist. Nat., 5), 1851, pp. 157, 301.—McCoy, British Pal. Rocks and Fossils, 1854, p. 21.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 444.—Milne-Edwards, Hist. Nat. Corall, 3, 1860, p. 308.—Duncan, Rep. 41st Meeting British Assoc. Adv. Sci., 1872, p. 130.—Salter, Cat. Camb. and Sil. Foss., 1873, p. 105.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 150.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 54.—Nicholson and Etheridge, Jour. Linn. Soc., Zool., 13, 1877, p. 361.—Nicholson, Tab. Corals Pal. Period, 1879, p. 130.—Zittel, Handb. Pal., 1, 1880, p. 619.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 444.—

**CœNITES**—Continued.

Miller, N. A. Geol. Pal., 1889, p. 179.—Sardeson, Neues Jahrb. f. Min., Geol. Pal. Beilage-Band, 10, 1896, pp. 252, 320.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 26.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 255.

Limaria Steininger, Mem. Soc. Geol. France, 1, 1834, p. 339, pl. 20, figs. 6, 6a.—Dana, Wilkes U. S. Expl. Exped. 1838–1842, 7, Zoophytes, 1846, p. 702.—Hall, Pal. New York, 2, 1852, p. 142.—Rominger, Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 390; Geol. Surv. Michigan, 3, pt. 2, 1876, p. 44.

Observation.—See Dictyostroma Nicholson for a probable synonym.

**Cœnites crassus** (Rominger).

Limaria crassa Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 45, pl. 18, fig. 1.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 341, fig.

Cœnites crassa Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 4, fig. 6.

Cladopora crassa Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 30.

Niagaran: Point of Barques, Lake Michigan; Lake Temiscaming, Quebec; Louisville, Kentucky.

**Cœnites fruticosus** (?Steininger) Hall.

Limaria fruticosa Steininger, Bull. Soc. Geol. France, 1, 1834, p. 339.—Hall, Pal. New York, 2, 1852, p. 143, pl. 39, figs. 5a, b.

Cœnites fruticosa Miller, N. A. Geol. Pal., 1889, p. 179 (gen. ref.).

Silurian: England; Lockport, New York (Lockport).

**Cœnites juniperinus** Eichwald.

Cœnites juniperinus Eichwald, Zool. Spec., 1, 1829, p. 197.—Edwards and Haime, Polyp. Foss. Terr. Pal., 1851, p. 301; Mon. British Foss. Corals, Pal. Soc., 1854, p. 276, pl. 65, figs. 4, 4a.—Nicholson, Pal. Tab. Corals, 1879, p. 134, pl. 6, figs. 5, 5b.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 1899, p. 27.

Silurian: England; Thorold, Ontario (Niagaran-Lockport).

**Cœnites laminatus** (Hall).

Limaria laminata Hall, Pal. New York, 2, 1852, p. 143, pl. 39, figs. 6a–d.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 45, pl. 18, fig. 2.

Cœnites laminata Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 151.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 55, fig. 25d, e.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 4, fig. 5.

Niagaran: Lockport, New York (Lockport); Drummond Island, Lake Huron; Louisville, Kentucky (Louisville).

**Cœnites lunatus** (Nicholson and Hinde).

Cœnites lunata Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 151, fig. 2.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 55, fig. 25a–c.—

Miller, N. A. Geol. Pal., 1889, p. 179, fig. 155.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 28.

Niagaran: Owen Sound, Ontario; North end of Lake Temiscaming, Quebec. Anticostian (Jupiter River): The Jumpers, Anticosti.

**Cœnites ramulosus** (Hall).

Limaria ramulosa Hall, Pal. New York, 2, 1852, p. 142, pl. 39, figs. 4a–d.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 44.

Cœnites ramulosa Miller, N. A. Geol. Pal., 1889, p. 179 (gen. ref.).

Niagaran (Lockport): Lockport, New York.



**Cœnites verticillatus** (Winchell and Marcy).

*Cladopora verticillata* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 84.

*Limaria verticillata* Rominger, Geol. Surv. Mich., 3, pt. 2, 1876, p. 45 (gen. ref.).

*Cœnites verticillata* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, figs. 1-4.

Niagaran: Chicago, Illinois (Racine); Louisville, Kentucky (Louisville); Tennessee (Brownspport).

**CÆNOGRAPTUS** Hall. See *Nemagraptus* Emmons.

**CÆNOGRAPTUS** (?**PLEUROGRAPTUS**? **PTEROGRAPTUS**) **DIVERGENS** Hall. See *Amphigraptus divergens*.

**CÆNOGRAPTUS EXILIS** Lapworth. See *Nemagraptus exilis*.

**CÆNOGRAPTUS GRACILIS** Hall. See *Nemagraptus gracilis*.

**CÆNOGRAPTUS** (**PLEUROGRAPTUS**) **LINEARIS** Roemer and Frech. See *Pleurograptus linearis*.

**CÆNOGRAPTUS SURCULARIS** Hall. See *Nemagraptus gracilis surcularis*.

**CÆNOSTOMA** Spencer. See *Cœnostroma* Winchell.

**CÆNOSTOMA BOTRYOIDEUM** Spencer. See *Clathrodictyon striatellum*.

**CÆNOSTOMA CONSTELLATUM** Spencer. See *Stromatopora constellata*.

**CÆNOSTROMA CONSTELLATUM** of authors. See *Stromatopora constellata*.

**CÆNOSTROMA GALTENSE** Dawson. See *Stromatopora galtensis*.

**COLEOLUS** Hall.

Genotype: *C. tenuicinctus* Hall.

*Coleolus* Hall, Pal. New York, 5, pt. 2, 1879, p. 184.—Zittel, Handb. Pal., 2, 1882, p. 315.—Miller, N. A. Geol. Pal., 1889, p. 389.—Whidborne, Mon. Dev. Fauna South England, 3, Pal. Soc., 1896, p. 38.—Koken, Die Leitfossilien, Leipzig, 1896, p. 96.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 283.

**Coleolus clintonensis** Foerste.

*Coleolus Clintonensis* Foerste, Geol. Surv. Ohio, 7, 1893, p. 547, pl. 37A, fig. 11. Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

**Coleolus iowensis** James.

*Coleolus iowensis* James, Amer. Geol., 5, 1890, p. 355. Richmond (Maquoketa): Illinois and Iowa.

**Coleolus spinulus** Hall.

*Coleolus spinulus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 322, pl. 33, fig. 8; Trans. Albany Inst., 10, 1883, p. 74.

Niagaran (Waldron): Waldron, Indiana.

**COLEOPRION** Sandberger.

Genotype: *C. gracilis* Sandberger.

*Coleoprion* Sandberger, Neues Jahrb. f. Min., etc., 1847, p. 24.—Woodward, Man. Mollusca, pt. 2, 1854, p. 206.—Pictet, Traité de Pal., 2d ed., 3, 1855, p. 320.—Ludwig, Paleontographica, 11, 1864, p. 317.—Barrande, Syst. Sil. Centre Boheme, 3, 1867, p. 108.—Hall, Pal. New York, 5, pt. 2, 1879, p. 183.—Zittel, Handb. Pal., 1882, p. 315.—Miller, N. A. Geol. Pal., 1889, p. 390.—Koken, Die Leitfossilien, Leipzig, 1896, p. 96.

**Coleoprion minuta** Walcott.

*Coleoprion minuta* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 85, pl. 11, figs. 17, 17a; pl. 12, fig. 21.

Upper Pogonip: Lone Mountain and Pogonip Ridge, Nevada.

*Cotypes*.—Cat. No. 17373, U.S.N.M.

**COLPOCERAS** Hall. See *Endoceras* Hall.

**COLPOMYA** Ulrich.

Genotype: *C. constricta* Ulrich.

*Colpomya* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 659; Geol. Minnesota, 3, pt. 2, 1894, p. 522.—Miller, N. A. Geol., Pal., 2d App., 1897, p. 780.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 516.

**Colpomya abrupta** Savage.

*Colpomya abrupta* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 94, pl. 5, fig. 27.

Upper Medinan (Edgewood): Near Edgewood, Missouri.

**Colpomya constricta** Ulrich.

*Colpomya constricta* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 659, pl. 52, figs. 17-19; Geol. Minnesota, 3, pt. 2, 1894, p. 523, fig. 41.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 516, figs. 695a, b.

Trenton (Perryville): Frankfort, Kentucky.

*Cotypes*.—Cat. No. 46120, U.S.N.M.

**Colpomya demissa** Ulrich.

*Colpomya demissa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 524, pl. 36, figs. 21, 22.

Black River (Decorah): Chatfield, Minnesota.

*Holotype*.—Cat. No. 46121, U.S.N.M.

**Colpomya faba** (Emmons).

*Nuculites faba* Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 385, fig. 5.

*Lyonsia faba* Conrad in Emmons, Amer. Geology, 1, pt. 2, 1855, p. 172, pl. 14, figs. 14, 15.

*Modiolopsis faba* Hall, Pal. New York, 1, 1847, p. 158, pl. 35, figs. 6a-d.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 408, fig.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 169, pl. 11, figs. 13-15.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 511.

Trenton: Watertown, etc., Middleville, New York; New Jersey; etc.

**Colpomya faba pusilla** Foerste.

*Modiolopsis faba* Hall, Pal. New York, 1; 1847, pl. 82, figs. 4a-b.

*Colpomya faba pusilla* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 275, pl. 2, fig. 10; pl. 3, figs. 4a, b.

Cincinnatian (Pulaski): Pulaski, New York; Chambly, Quebec.

**COLUMNARIA** Goldfuss.

Genotype: *C. alveolata* Goldfuss.

*Columnaria* Goldfuss, Petrefacta Germaniæ, 1, 1826, p. 72.—Eaton, Geol. Textb., 2d ed., 1832, p. 40.—Steininger, Mem. Soc. Geol. France, 1, 1834, p. 343.—Koninck, Desc. Animaux Fossiles, Liege, 1842-1844, p. 25.—Dana, Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 188; Wilkes U. S. Expl. Exped., 1838-1842, 7. Zoophytes, 1846, p. 362, pl. 26, figs. 9, 9a, 9b, 10.—McCoy, Ann. Mag. Nat. Hist., 2d ser., 3, 1849, p. 121.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 25.—Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch Mus. Hist. Nat., 5), pp. 159, 308.—McCoy, Cont. British Pal., 1854, p. 90; British Pal., Rocks and Foss., 1854, p. 92.—Billings, Canadian Nat. Geol., 1, 1856, p. 124; 3, 1858, p. 420; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 166; Pictet,



**COLUMNARIA**—Continued.

- Traite Pal., 2d ed., 4, 1857, p. 448.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 317.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 67.—Ludwig, Paleontographica, 10, 1862, p. 191.—Verrill, Amer. Jour. Sci., 3d ser., 3, 1872, p. 191.—Duncan, Rep. 41st Meeting British Assoc. Adv. Sci., 1872, p. 132.—Verrill, Ann. Mag. Nat. Hist., 4th ser., 9, 1872, p. 360.—Nicholson, Rep. 44th Meeting British Assoc. Adv. Sci., Notes and Abstracts, 1875, p. 89.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 89.—Nicholson, Tab. Corals Pal. Period, 1879, p. 191.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 463.—Miller, N. A. Geol. Pal., 1889, p. 179.—Frech, Paleontographica, 37, 1890, p. 84.—Sherzer, Amer. Geol., 7, 1891, pp. 278–283.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 97.—Weissermel, Zeits. d. d. geol. Gesell., 49, 1897, pp. 866, 868, 880.—Zittel-Eastman Textb. Pal. 1., 1900, p. 79.—Lambe, Cont. Canadian, Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 97.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 71.—Cumings, 32d Ann. Rep. Geol. Nat. Res. Indiana, 1908, p. 699.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 87.
- Favistella Dana, Wilkes U. S. Expl. Exped., 1838–1842, 7, Zoophytes, 1846, p. 538.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 24.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 229.—Hall, Pal. New York, 1, 1847, p. 275; *ibid.*, 2, 1852, p. 120.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 184; Rep. 44th Meeting British Assoc. Adv. Sci., Notes and Abstracts, 1875, p. 89; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 21; Trans. Royal. Soc. Edinburgh, 27, 1876, p. 249 (*obiter*); Tab. Corals Pal. Period, 1879, p. 192.—Zittel, Handb. Pal., 1, 1879, p. 230.—Miller, N. A. Geol. Pal., 1889, p. 188. (Genotype: *F. stellata* Hall.)
- Palæophyllum Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 168; Canadian Nat. Geol., 3, 1858, p. 422.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 219.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, pp. 68, 69.—Zittel, Handb. Pal., 1, 1879, p. 228.—Miller, N. A. Geol. Pal., 1889, p. 198.—Sherzer, Amer. Geol., 7, 1891, pp. 284–289.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 146.—Lambe, Ottawa Naturalist, 12, 1899, p. 217. (Genotype: *Palæophyllum rugosum* Billings.)

**COLUMNARIA ALVEOLARIS** Hitchcock. See *Columnaria alveolata*.

**Columnaria alveolata** Goldfuss.

- Columnaria alveolata* Goldfuss, Petrefacta Germaniæ, 1, 1826, p. 72, pl. 24, figs. 7a–c; 2d ed., pt. 1, 1862, p. 68.—Edwards and Haime (part), Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. Hist. Nat., 5), 1851, p. 309.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 229, pl. 4, fig. 10; Man. Geol., 1860, p. 94, fig. 80.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 317.—Chapman, Canadian Jour., n. s., 6, 1861, p. 510, fig. 78; 8, 1863, p. 197, fig. 168; Expos. Min. Geol. Canada, 1864, p. 104, fig. 78; p. 169, fig. 168.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 1, fig. 7.—Nicholson, Tab. Corals Pal. Period, 1879, p. 195, pl. 10, figs. 1, 1a.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 464, fig. 113.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 153, fig.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 6, fig. 3; pl. 7, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 180, fig. 157.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 98.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 151.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, p. 98, pl. 6, figs. 1, 1a.—Foerste, Amer. Geol., 31, 1903, p. 343.—Hayes and Ulrich, U. S. Geol. Surv., fol. 95, illus. sheet, 1903, fig. 25.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 71, fig. 110.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 703, pl. 1, figs. 4, 4a.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 312, pl. 11, fig. 3.

**Columnaria alveolata**—Continued.

*Columnaria sulcata* Eaton, Geol. Textb., 2d ed., 1832, p. 4, pl. 5, fig. 51.—Clarke, 11th Rep. State Geol. New York, 1, 1894, p. 35; 45th Rep. New York State Mus. 1894, p. 351.

*Columnaria multiradiata* Castelnau, Essai Syst. Sil. Amer. Sept., 1843, p. 44, pl. 19, fig. 1.

*Columnaria Blainvilli* Billings, Canadian Nat. Geol., 3, 1858, p. 421; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 166.

*Favistella stellata* Hall, Pal. New York, 1, 1847, p. 275, pl. 75, figs. 1a-c.—Emons, Amer. Geology, 1, pt. 2, 1855, p. 229, fig. 81.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 206, fig. 202.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 22; Geol. Surv. Ohio, Pal. 2, 1875, p. 185.—White, Rep. U. S. Geogr. Surv. West 100th Merid., 4, 1877, p. 67, pl. 4, figs. 6a-c; 11th Ann. Rep. Indiana Dep. Geol., Nat. Hist., 1882, p. 378, pl. 44, figs. 1, 2.—Hall, 12th Rep., ibid., 1883, p. 247, pl. 1, figs. 2-4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 236, figs.—Miller, N. A. Geol. Pal., 1889, p. 188, fig. 173.

*Favistella alveolaris* Dana, Wilkes U. S. Expl. Exped. 1838-1842, 7, Zoophytes, 1846, p. 538.

*Columnaria stellata* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 91, pl. 28, fig. 1; pl. 34, fig. 3.—Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 7, fig. 1.—Keyes, Missouri Geol. Surv., 4, 1894, p. 116, pl. 13, fig. 3.

Stones River—Richmond: An abundant and widespread fossil of the United States and Canada.

**COLUMNARIA ALVEOLATA-CALYCINA** Foerste. See *Columnaria calicina*.

**Columnaria alveolata discreta** Foerste.

*Columnaria alveolata discreta* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 124.

Black River: Ottawa, Cloche Island, etc., Canada.

**Columnaria alveolata interventa** Foerste.

*Columnaria alveolata interventa* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 122, pl. 4, figs. 1a-j.

Trenton (Cynthiana): Near Brannon, etc., central Kentucky.

**Columnaria alveolata minima** Foerste.

*Columnaria alveolata minima* Foerste Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 123.

Trenton (Cynthiana): Near New Forest, Kentucky.

**Columnaria alveolata rigida** (Billings).

*Columnaria rigida* Billings, Canadian Nat. Geol., 3, 1858, p. 421; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 167.

Richmond: Lake St. John, Canada.

**COLUMNARIA BLAINVILLI** Billings. See *Columnaria alveolata*.

**Columnaria calicina** (Nicholson).

*Favistella* (*Columnaria*) *calicina* Nicholson, Rep. 44th Meeting Brit. Assoc. Adv. Sci., Notes and Abstracts, 1874, p. 89.

*Favistella calicina* Nicholson, Rep. Prov. Ontario, pt. 2, 1875, p. 24, fig. 9.

*Columnaria calicina* Nicholson, Tab. Corals Pal. Period, 1879, p. 197, pl. 10, figs. 2, 2a; p. 198, fig. 28, 1a, b.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 464.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 98.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 102, pl. 6, fig. 4.



**Columnaria calicina**—Continued.

*Columnaria alveolata-calycina* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 313.

*Columnaria herzeri* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 91.

Richmond: Cape Smyth, Lake Huron; Credit River at Streetsville, Ontario; east of White Cliff, Gamache Bay, Anticosti; Ohio; Kentucky; Indiana.

**Columnaria carterensis** Safford.

*Columnaria carterensis* Safford, Geol. Tennessee, 1869, p. 285.

Black River (Carters): Carters Creek, etc., central Tennessee.

**Columnaria divergens** Troost.

Not recognized.

*Columnaria divergens* Troost, 5th Geol. Rep. Tennessee, 1840, p. 73.

Mountain limestone: Near Nashville, Tennessee.

**COLUMNARIA ERRATICA** Billings. See *Columnaria* (*Palæophyllum*) *stokesi*.

**COLUMNARIA GOLDFUSSI** Billings. See *Lyopora goldfussi* and *Nyctopora billingsii*.

**Columnaria halli** Nicholson.

*Columnaria* ——— Emmons, Geol. New York, Rep. 2d dist., 1842, p. 276, fig. 2.

*Columnaria alveolata* Hall, Pal. New York, 1, 1847, p. 47, pl. 12, figs. 1a–1c.—Billings, Canadian Nat. Geol., 1, 1857, p. 124, figs. 9, 10.—Nicholson, Pal. Prov. Ontario, 1863, pp. 8, 24, figs. 2, 9.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 139, fig. 70.—Rominger, Foss. Corals Michigan, 1876, p. 89, pl. 34, figs. 1, 2, 4.

*Columnaria*(?) *Halli* Nicholson, Tab. Corals Pal. Period, 1879, p. 200, fig. 28, 2; p. 201, fig. 29, pl. 10, figs. 3, 3a.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 465.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 85, pl. G, figs. 14–16.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 100, pl. 6, figs. 2, 2a.—Foerste, Amer. Geology, 31, 1903, pp. 343, 345.—Hayes and Ulrich, U. S. Geol. Surv., folio 95, illust. sheet, 1903, fig. 47.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 71.

Black River and Trenton: Canada; New York; Michigan; Kentucky; Tennessee; Minnesota; Illinois; Iowa.

*Plesiotype*.—Cat. No. 35403, U.S.N.M. (Hayes and Ulrich).

**Columnaria? helderbergiæ** Swartz.

*Columnaria? helderbergiæ* Swartz, Maryland Geol. Surv., Low. Dev., p. 207, pl. 21, figs. 10, 11.

Helderbergian (Keyser): Warrior Mountain, Alleghany County, Maryland.

**COLUMNARIA HERZERI** ROMINGER. See *Columnaria calicina*.

**COLUMNARIA INÆQUALIS** Hall. See *Prismatophyllum inæquale*.

**COLUMNARIA INCERTA** Billings. See *Fletcheria incerta*.

**Columnaria mamillaris** Castelnau.

Not recognized.

*Columnaria mamillaris* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 45, pl. 19, fig. 3.

Silurian?: Shores of Lake Huron.

**COLUMNARIA MULTIRADIATA** Castelnau. See *Columnaria alveolata*.

**COLUMNARIA PARVA** Billings. See *Stylaræa parva*.

**COLUMNARIA RIGIDA** Billings. See *Columnaria alveolata rigida*.

**COLUMNARIA RUGOSA** Lambe. See *Columnaria* (*Palæophyllum*) *stokesi*.

**COLUMNARIA STELLATA** Rominger. See *Columnaria alveolata*.

**Columnaria (Palæophyllum) stokesi** (Edwards and Haime).

Lithostrotion Stokesi Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851, p., 440, pl. 20, fig. 2.

Diphyphyllum Stokesi Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897 p. 152, pl. 17, figs. 5a, b.

Sarcinula? obsoleta Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 213, pl. 29, figs. 2, a, b.

Columnaria erratica Billings, Canadian Nat. Geol., 3, 1858, p. 421; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 167.

Palæophyllum rugosum Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 168; Canadian Nat. Geol., 3, 1858, p. 422.

Columnaria rugosa Lambe, Ottawa Naturalist, 12, 1899, p. 217; Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 101, pl. 6, figs. 3, 3a, b.

Richmond: Lake Winnipeg, Lake St. John, etc., Canada; Green Bay, Wisconsin.

**COLUMNARIA SULCATA** Eaton. See *Columnaria alveolata*.

**Columnaria? sutherlandi** Salter.

Columnaria Sutherlandi Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, 1852, p. 231, pl. 6, fig. 8.

Silurian (?): Seal Island, Wellington Channel, Arctic America.

**Columnaria (Palæophyllum) thomi** (Hall).

Columnaria thomi Hall, Rep. U. S. Mexican Bound. Surv., Emory, 1857, pl. 20, figs. 1a-d.

Cyathophylloides thomii Walcott, Pal. Univ., ser. 1, fas. 2, 1903, pl. 29.

Richmond: El Paso, Texas.

*Holotype*.—Cat. No. 9851, U.S.N.M.

Observation.—Probably the same as *Columnaria (Palæophyllum) stokesi* (Edwards and Haime).

**Columnaria troosti** Castelnau.

Not recognized.

Columnaria Troosti Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 44, pl. 19, fig. 2.

Silurian(?): Kentucky.

**Columnaria vacua** Foerste.

Columnaria(?) halli James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 99.

Columnaria vacua Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 313, pl. 11, fig. 2.

Richmond: Ohio, Indiana, Kentucky, etc.

Observation.—This name has been proposed for the Richmond form of *Columnaria* closely related to *C. halli* which is restricted to Mohawkian strata. Some of the references under *C. halli* doubtless refer in part to *C. vacua*.

**COLUMNOPORA** Nicholson. See *Calapœcia* Billings.

**COLUMNOPORA RAYI** Davis. See *Calapœcia cribiformis*.

**COMAROCYSTIS** Haeckel. See *Comarocystites* Billings.

**COMAROCYSTITES** Billings.

Genotype: *C. punctatus* Billings.

Comarocystites Billings, Canadian Jour., 2, 1854, pp. 268, 269; Geol. Surv.

Canada, Rep. Progr. for 1853-56, 1857, p. 288; Geol. Surv. Canada, dec. 3, 1858, p. 61.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Meek and

Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 143; Geol. Surv.



**COMAROCYSTITES**—Continued.

Illinois, 3, 1868, p. 291.—Zittel, Handb. Pal., 1, 1879, p. 418.—Miller, N. A. Geol. Pal., 1889, p. 233.—Jaekel, Zeits. d. d. geol. Gesell. 52, 1900, p. 676.—Zittel, Grundzuge Pal., 1, p. 184.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472.

*Comarocystis* Haekel, Amphorideen u. Cystoideen, 1896, p. 70, pl. 1, figs. 4-4C.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 55.

**Comarocystites obconicus** (Meek and Worthen).

*Comarocystites* Shumardi var. *obconicus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 144; Geol. Surv. Illinois, 3, 1868, p. 294, pl. 1, fig. 2a, b.

*Comarocystites obconicus* Miller, N. A. Geol. Pal., 1889, p. 234.—Keyes, Missouri Geol. Surv., 4, p. 132, pl. 18, fig. 1.

Black River (Kimmswick): Cape Girardeau, Missouri.

**Comarocystites punctatus** Billings.

*Comarocystites punctatus* Billings, Canadian Jour., 2, 1854, p. 270, figs. 1-3; Geol. Surv. Canada Rep. Progr. for 1853-56, 1857, p. 288; Geol. Surv. Canada, dec. 3, 1858, p. 61, pl. 5, figs. 1, 1b, 2, 2b; also footnote, pl. 5.—Grant, Trans. Ottawa Field Nat. Club, 1, 1880, p. 29, pl. 1, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472.

*Comarocystis punctata* Haeckel, Amphorideen u. Cystoideen, 1896, p. 70, pl. 1, figs. 4-4c.

Trenton (Curdsville): Ottawa, Ontario.

**Comarocystites shumardi** Meek and Worthen.

*Comarocystites* Shumardi Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 143; Geol. Surv. Illinois, 3, 1868, p. 292, fig.; pl. 1, figs. 1a, b.—Miller, N. A. Geol. Pal., 1889, p. 233, fig. 270.—Keyes, Missouri Geol. Surv., 4, 1894, p. 132, pl. 18, fig. 2.—Jaekel, Zeits. d. d. geol. Gesell., 52, 1900, p. 676.

Black River (Kimmswick): Cape Girardeau, Missouri.

**COMAROCYSTITES SHUMARDI** var. **OBCONICUS** Meek and Worthen. See *Comarocystites obconicus*.

**COMPSOCRINUS** Miller.

Genotype: *Glyptocrinus harrisi* Miller.

*Compsocrinus* Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, pp. 219, 233.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 180 (Rev. Pal., 3, p. 104).—Miller, N. A. Geol. Pal., 1889, p. 234.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 516.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 165, fig. 78, 4.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 194.

**Compsocrinus harrisi** (Miller).

*Glyptocrinus harrisi* Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 74, pl. 1, figs. 4, 4a.

*Compsocrinus harrisi* Miller, *ibid.*, 6, 1883, p. 234, pl. 7, figs. 4, 4a; N. A. Geol. Pal., 1889, p. 234, figs. 271, 272.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, figs. 8a, b.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 165, fig. 78.

*Mariacrinus Harrisi* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, pp. 311, 326 (Rev. Pal., pt. 3, p. 104).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 118.

Richmond (Liberty): Waynesville, Ohio.

*Holotype* and *plesiotype*.—Cat. No. 40759, U.S.N.M.

**Compsocrinus miamiensis** (Miller).

*Glyptocrinus miamiensis* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 34, pl. 1, fig. 1; 6, 1883, p. 224.—James, *ibid.*, 19, 1897, p. 115.

*Compsocrinus miamiensis* Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 518, pl. 21, figs. 7a, b.

Richmond (Liberty): Waynesville, Ohio.

*Holotype*.—Cat. No. 40760, U.S.N.M.

**CONASPIS OWENI** Hall. See *Ptychoparia oweni*.

**CONCHICOLITES** Nicholson. See *Cornulites Schlotheim*.

**CONCHIDIUM** Linnæus.

Genotype: *C. biloculare* Linnæus.

*Conchidium* Linnæus, Mus. Tessinianum, 1753, p. 90; Syst. Nat., XI, 2, 1760, p. 163.—Ehler, Fischer's Manuel de Conchyliologie, 1887, p. 1311.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 231; 13th Ann. Rep. New York State Geol., 1895, p. 842.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 321.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 273.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 394.

*Helmintholitus* Linnæus, Sys. Nat., 4, 1766, p. 163.

*Pentamerus* Sowerby (not *Pentamera* Dumeril, 1806), Mineral Conchology, 1, 1813, p. 73.

*Gypidia* Dalman, Kongl. Svenska Vet.-Akad. Handl., för 1827, 1828, pp. 93, 100.—Zittel, Handb. Pal., 1, 1880, p. 694.—Koken, Die Leitfossilien, Leipzig, 1896, p. 244, fig. 206.

*Pentamerus* Billings, Canadian Jour., 6, 1861, p. 269.—Hall, 20th Rep. New York State Geol. Nat. Hist., 1867, p. 163; Pal. New York, 4, 1867, pp. 369, 373.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 52.

*Antirhynchonella* Quenstedt, Petref. Deutschlands, Brach., 1871, p. 231.

Zdimir Barrande, Syst. Sil. Bohème, 6, 1881, p. 171.

**Conchidium arcticum** Høltedahl.

*Conchidium arcticum* Høltedahl 2d Arct. Exp. "Fram," 1898-1902, No. 32, 1914, p. 5, pl. 6, figs. 5-7.

Niaganan: Baadkap, North Devon, Arctic America.

**Conchidium biloculare** Linnæus.

*Conchidium biloculare* Linnæus, Syst. Nat., XI, 2, 1760, p. 163.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 233, pl. 6, figs. 11-14.—Schuchert, Bull. U. S. Geol. Surv. 87, 1897, p. 185.

*Pentamerus conchidium* Emerson, Geol. Frobenius Bay; Nurses Narr. Hall's Arctic Exped., 1879, p. 578.—Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., p. 225, 1852, pl. 5, figs. 9, 10.

Silurian: Europe; Rescue Harbor, Arctic America.

**Conchidium colletti** (Miller).

*Pentamerus colletti* Miller, 17th Rep. State Geol. Indiana, 1891, p. 77, pl. 13, figs. 5, 6 (ad. sheets, 1891, p. 77).

*Conchidium colletti* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 66, figs. 16, 17.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 30.

Cayugan (Kokomo): Kokomo, Indiana.

**Conchidium crassiplica** Hall and Clarke.

*Conchidium crassiplica* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pp. 235, 369, pl. 66, figs. 24, 25; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 367, pl. 11, figs. 3, 4; 14th Rep. State Geol. New York for 1894, 1897, p. 367, pl. 11, figs. 3, 4.

Niaganan (Louisville): Near Louisville, Kentucky.



*Conchidium crassiradiatum* Schuchert. See *Conchidium crassoradius*.

***Conchidium crassoradius* (McChesney).**

*Pentamerus crassoradius* McChesney, *Descr. New Pal. Foss.*, 1861, p. 87.

*Conchidium crassiradiatum* Schuchert, *Bull. U. S. Geol. Surv.*, 87, 1897, p. 185.

Niagaran (Racine): Milwaukee, Wisconsin.

***Conchidium decussatum* (Whiteaves).**

*Pentamerus decussatus* Whiteaves, *Canadian Rec. Sci.*, 1891, p. 295, pl. 3, figs.

3, 4.—Calvin, *Bull. Lab. Nat. Hist.*, State Univ. Iowa, 11, 1892, p. 164, pl. 11, figs. 1-3; pl. 12, fig. 2.

*Conchidium decussatum* Hall and Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 235, pl. 65, figs. 1, 2; pl. 66, fig. 15.—Whiteaves, *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 293, pl. 26, figs. 1, 2.

Niagaran: Grand Rapids of the Saskatchewan, etc., Canada.

***Conchidium exponens* Hall and Clarke.**

*Conchidium exponens* Hall and Clarke, *Pal. New York*, 8, pt. 2, 1895, pl. 66.

figs. 6-9; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 366, pl. 10, figs. 20-23; 14th Rep. State Geol. New York for 1894, 1897, p. 366, pl. 10, figs. 20-23.

Niagaran (Louisville): Louisville, Kentucky.

***Conchidium georgiæ* Hall and Clarke.**

*Conchidium georgiæ* Hall and Clarke, *Pal. New York*, 8, pt. 2, 1895, p. 369, pl.

66, figs. 18, 19; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 367, pl. 11, figs. 10, 11; 14th Rep. State Geol. New York for 1894, 1899, p. 367, pl. 11, figs. 10, 11.

Clinton: Trenton, Georgia.

***Conchidium greenii* Hall and Clarke.**

*Conchidium greenii* Hall and Clarke, *Pal. New York*, 8, pt. 2, 1895, pp. 235, 368,

pl. 66, figs. 20-22; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 367, pl. 11, figs. 5-7; 14th Rep. State Geol. New York for 1894, 1897, p. 367, pl. 11, figs. 5-7.

Niagaran (Racine): Near Milwaukee, Wisconsin.

***Conchidium knappi* (Hall and Whitfield).**

*Pentamerus knappi* Hall and Whitfield, 24th Rep. New York State Cab. Nat.

Hist., 1872, p. 184; 27th Rep., 1875, pl. 10, figs. 10-12.—Nettelroth *Kentucky Foss. Shells, Mem. Kentucky Geol. Surv.*, 1889, p. 55, pl. 28, figs. 1-4.

*Conchidium knappi* Hall and Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 235, pl. 64, figs. 11-13.

Niagaran (Louisville): Louisville, Kentucky; Tennessee.

*Plesiotype*.—Cat. No. 51352, U.S.N.M.

***Conchidium laqueatum* (Conrad).**

*Pentamerus laqueatus* Conrad, *Proc. Acad. Nat. Sci. Philadelphia*, 7, 1855, p.

441.—Hall, 42d Rep. New York State Mus. Nat. Hist., 1889, p. 384 (foot-note).

*Pentamerus nobilis* Emmons, *Man. Geol.*, 1860, p. 107, fig.

*Conchidium laqueatus* Hall and Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 232, fig. 168; p. 234, pl. 65, figs. 3-9.—Kindle and Breger, 28th Rep. Dep. Geol.

Nat. Res. Indiana, 1904, p. 434, pl. 3, figs. 1, 2; pl. 4, fig. 3; pl. 6.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 274.

Niagaran: Delphi, Huntington, Georgetown, etc., Indiana.

**Conchidium legoense** Foerste.

*Conchidium legoense* Foerste, Jour. Geol., 11, 1903, p. 711; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 69, pl. 2, fig. 36A, B.

Niagaran (Brownsport): Short Creek, northeast of Lego, Tennessee.

**Conchidium lindenense** Foerste.

*Conchidium lindenense* Foerste, Jour. Geol., 11, 1903, p. 711.—Bull. Sci. Lab. Denison Univ., 14, 1909, p. 69, pl. 2, fig. 35A, B.

Niagaran (Brownsport): Coon Creek, near Linden, Tennessee.

**Conchidium littoni** (Hall).

*Pentamerus littoni* Hall, Pal. New York, 3, 1859, p. 262.—Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 186; 27th Rep., 1875, pl. 10, figs. 8, 9.—Nettelroth, Kentucky Foss. Shells, Mem. Kentucky Geol. Surv., 1889, p. 58, pl. 27, figs. 12, 13.

*Conchidium littoni* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 64, figs. 9, 10.—Foerste, Jour. Geol., 11, 1903, p. 711 (loc. occ.).

*Conchidium* cf. *littoni* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 435, pl. 3, figs. 3–6; pl. 4, figs. 1, 2, 4; pl. 5, figs. 4, 5.

Niagaran: Hardin County, Tennessee (Brownsport); Louisville, Kentucky (Louisville); ?Georgetown, Indiana.

**Conchidium multicostatum** (Hall).

*Pentamerus multicostatus* Hall, Geol. Surv. Wisconsin, Rep. Progr., 1860, p. 1; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 373, pl. 13, figs. 22–24.

*Conchidium multicostatum* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 64, fig. 6; pl. 66, fig. 10.

*Conchidium* cf. *multicostatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 435, pl. 6, fig. 3.

Niagaran: Wauwatosa and Waukesha, Wisconsin (Racine and Guelph); Connors Mills, Hamilton County, Indiana (Noblesville).

**Conchidium nettelrothi** Hall and Clarke.

*Pentamerus knightii* Nettelroth (not Sowerby), Kentucky Fossil Shells, Mem. Geol. Surv. Kentucky, 1889, p. 57, pl. 29, figs. 1, 2, 17.

*Conchidium nettelrothi* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 234.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 273, fig. 332.

Onondaga? (?Niagaran): Louisville, Kentucky.

*Cotypes*.—Cat. No. 51312, U.S.N.M.

**Conchidium nysius** (Hall and Whitfield).

*Pentamerus nysius* var. *crassicosta* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 184; 27th Rep., 1875, pl. 10, figs. 4–7.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Survey, 1889, p. 60, pl. 28, figs. 5–8.

*Pentamerus nysius* var. *tenuicostatus* Nettelroth, *ibid.*, 1889, p. 60.

*Conchidium nysius* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 64, figs. 1, 8, 27.

Niagaran (Louisville): Louisville, Kentucky; Tennessee.

**Conchidium obsoletum** Hall and Clarke.

*Conchidium obsoletum* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 67, figs. 8, 9; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 366, pl. 11, figs. 1, 2; 14th Rep. State Geol. New York for 1894, 1897, p. 366, pl. 11, figs. 1, 2.

Niagaran (Guelph): Genoa, Ottawa County, Ohio.



**Conchidium occidentale** Hall.

*Pentamerus occidentalis* Hall, Pal. New York, 2, 1852, p. 341, pl. 79, figs. 1, 2.—Billings, Geol. Canada, 1863, p. 337, fig. 341.—Nicholson, Pal. Prov. Ontario, 1875, p. 67, fig. 35.—Whitfield, Geol. Wisconsin, 4, 1882, p. 314, pl. 17, fig. 10; pl. 23, figs. 1, 2.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 239.

*Conchidium*(?) *occidentalis* Hall and Clarke, *ibid.*, 1895, pl. 67, figs. 1-5.—Lesley, Geol. Surv. Pennsylvania., Rep. P 4, 1889, p. 618, fig.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 273, fig. 331.

Niagaran (Guelph): Gault and Guelph, Ontario; Point St. Vital, Lake Huron; Williamstown, Wisconsin.

**Conchidium scoparium** Hall and Clarke.

*Conchidium scoparium* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 67, figs. 6, 7; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 366, pl. 11, figs. 8, 9; 14th Rep. State Geol. New York for 1894, 1897, p. 366, pl. 11, figs. 8, 9.

Niagaran (Guelph): Durham, Ontario.

**Conchidium tenuicostatum** (Hall and Whitfield).

*Pentamerus nysius* var. *tenuicosta* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 184; 27th Rep., 1875, pl. 10, figs. 1-3.

*Pentamerus complanatus* Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Survey, 1889, p. 53, pl. 27, figs. 14-16.

*Conchidium tenuicostatus* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 64, figs. 3-5.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 187.

Niagaran (Louisville): Louisville, Kentucky.

*Plesiotypes*.—Cat. No. 51353, U.S.N.M. (Nettelroth's types of *P. complanatus*).

**Conchidium trilobatum** Kindle and Breger.

*Conchidium trilobatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 436, pl. 5, figs. 1-3.

Niagaran: Huntington, Indiana.

*Cotypes*.—Cat. No. 52933, U.S.N.M.

**Conchidium unguiforme** (Ulrich).

*Gypidia unguiformis* Ulrich, Contrib. Amer. Pal., 1886, p. 28, pl. 3, fig. 2.

*Gypidula unguiformis* Miller, N. A. Geol. Pal., 1889, p. 346.

*Conchidium unguiformis* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 66, figs. 1-4.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 436, pl. 6, figs. 4, 5.

Niagaran: Louisville, Kentucky (Louisville); Carroll County, Indiana.

*CONCHITA RHOMBOIDALIS* Wilckens. See *Leptaena rhomboidalis*.

**CONCHOPELTIS** Walcott.

Genotype: *C. alternata* Walcott.

*Conchopeltis* Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, p. 93; mus. ed., 1879, p. 93.—Miller, N. A. Geol. Pal., 1889, p. 400.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 823.—Berkey, Amer. Geol., 21, 1898, p. 278.

**Conchopeltis alternata** Walcott.

*Conchopeltis alternata* Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, p. 93; mus. ed., 1879, p. 93.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 823, fig. 2.

Trenton: Trenton Falls, New York.

*CONCHOPELTIS COMPRESSA* Miller. See *Scenella compressa*.

*CONCHOPELTIS MINNESOTENSIS* Walcott. See *Scenella superba*.

*CONCHOPELTIS OBTUSA* Sardeson. See *Scenella obtusa*.

*CONILITES* Pusch. See *Actinoceras* Bronn.

*CONILITES CAPRICORNULUS* Troost. See *Cyrtoceras capricornulus*.

**CONOCARDIUM** Dekoninck.

Genotype: *C. hibernicum* Dekoninck.

*Conocardium* Dekoninck, Desc. Animaux Fossiles, Suppl., Liege, 1851, p. 673.—McCoy, British Pal. Rocks and Foss., 1854, p. 516.—Woodward, Man. Mollusca, pt. 2, 1854, p. 292, pl. 19, fig. 5.—Pictet, Traité Pal., 2d ed., 3, 1855, p. 477.—Barrande, Syst. Sil. Centre Boheme, 6, 1881, p. 66; Acephales: Ext. Syst. Sil. Centre Boheme, p. 103.—Zittel, Handb. Pal., 2, 1881, p. 100.—Dekoninck, Ann. Mus., Royal Hist. Nat. Belgique, 11, 1885, p. 99.—Hall, Pal. New York, 5, pt. 1, Lam. 2, 1885, p. 34.—Barrois, Mem. Soc. Geol. Nord, 3, Lille, 1889, p. 155; Mem. Soc. Agriculture et Arts de Lille, 4th ser., 17, 1889, p. 155.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 202.—Miller, N. A. Geol. Pal., 1889, p. 472.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 18.—Koken, Die Leitfossilien, Leipzig, 1896, p. 210, fig. 176, 1-3.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 261.—Hind, Mon. Brit. Carb. Lam., 1, Pal. Soc., 1900, p. 449.

**Conocardium antiquum** (Owen).

*Pleurorhynchus antiqua* Owen, Geol. Wisconsin, Iowa, and Minnesota, 1852, pl. 2, fig. 19.

*Conocardium antiquum* Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 42 (adv. sheets, 1862) (gen. ref.).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 187.

Richmond: Lower Fort Garry, Red River, Canada.

*Holotype*.—Cat. No. 17897, U.S.N.M.

**Conocardium beecheri** Raymond.

*Conocardium beecheri* Raymond, Amer. Jour. Sci., 20, 1905, p. 374.

Chazy: Sloop Island, east of Valcour Island and at Chazy, New York (Valcour); Mingan Islands, Canada (Mingan).

**CONOCARDIUM BLUMENBACHII** Billings. See *Euchasma blumenbachi*.

**Conocardium elegantulum** Billings.

*Conocardium elegantulum*, Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 53.

Anticostian (Jupiter River and Chicotte): Southwest Point, Anticosti.

**Conocardium elrodi** Miller.

*Conocardium elrodi* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 705, pl. 20, fig. 14 (adv. sheets, 1891, p. 95).

Niagaran (Laurel): Hartsville, Indiana.

**Conocardium immaturum** Billings.

*Conocardium immaturum* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 143, fig. 83a; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 41, text fig. 43 (adv. sheets, 1862).

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

**Conocardium monroicum** Grabau.

*Conocardium monroicum* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 171, pl. 16, figs. 1-3; pl. 20, figs. 14, 15; pl. 22, fig. 3.

Upper Monroan: Salt shaft at Detroit, Michigan (Anderdon); opposite Amherstburg, Ontario (Amherstburg); Wayne County, Michigan (Lucas).



**Conocardium multistriatum** Kindle and Breger.

*Conocardium multistriatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 449, pl. 10, fig. 4.

Niagaran: Georgetown, Indiana.

**Conocardium niagarensis** Winchell and Marcy.

*Conocardium niagarensis* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 97, pl. 2, fig. 14.

Niagaran (Racine): Chicago, Illinois.

**Conocardium ornatum** Winchell and Marcy.

*Conocardium ornatum* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 111, pl. 2, fig. 15.

Niagaran (Racine): Chicago, Illinois.

**Conocardium oweni** Kindle and Breger.

*Conocardium oweni* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 450, pl. 10, figs. 2, 3.

Niagaran (Noblesville): Little Deer Creek and Connors Mill, Hamilton County, Indiana.

**Conocardium richmondense** Foerste.

*Conocardium richmondensis* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 71, pl. 2, fig. 21A, B.

Richmond (Elkhorn): Elkhorn Creek, three miles south of Richmond, Indiana.

**Conocardium tegulum** Hall.

*Conocardium tegulum* Hall, Pal. New York, 5, pt. 1, Lam. 2, 1885, p. 415, pl. 68, figs. 30, 31 (adv. sheets, 1883).

Niagaran: Locality not given.

CONOCEPHALE Edwards. See *Conocephalites* Zenker.

CONOCEPHALINA Gronwall. See *Conocephalina* Brögger.

**CONOCEPHALITES** Zenker.

Genotype: *Conocephalus costatus* Zenker.

*Conocephalites* Zenker, Beitr. z. Naturg. Urwelt., 1833, p. 48.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 779; Syst. Sil. Centre Boheme, 1, 1852, p. 415, pls. 13, 14, 29.—Pictet, Traite Pal., 2d ed. 2, 1854, p. 493.—Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, pp. 147, 148.—Chapman, Canadian Jour., n. s., 8, 1863, p. 32, fig. 150; p. 192, fig. 161; Expos. Min. Geol. Canada, 1864, p. 140.—Hall, Trans. Albany Inst., 5, 1867, p. 129.—Billings, Canadian Nat., n. s., 6, 1872, p. 474; Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 72.—Meek, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 22.—Woodward, Geol. Mag., dec. 3, 1, 1884, p. 343.—Walcott, Science, 3, 1884, p. 281.—Zittel, Handb. Pal., 2, 1855, p. 600.—Ehlert, Bull. Soc. Geol. de France, 3d ser., 23, 1895, p. 319.—Wallerius, Unders. ofver. Zonen med. Agnostus lævigatus i Vestergotland, Lund, 1895, pp. 49, 50; Geol. Foren. Stockholm Forhandl. 18, 1896, p. 167.—Koken, Die Leitfossilien, Leipzig, 1896, p. 21.—Jaekel, Zeits. d. d. geol. Gesell., 53, 1901, p. 156.

*Conocephale* Edwards, Hist. Nat. Crustacea, 3, 1840, p. 335.

*Conocephalus* Burmeister, Org. der Tril., Berlin, 1843, p. 85.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 556.—Emmrich, ibid., 1845, p. 43.—Burmeister, Org. Tril. London, 1846, p. 72.—Frech, Leth. geog., 1 Th., Leth. Pal., 2, 1897, p. 26, footnote.

CONOCEPHALITES CALCIFERUS Walcott. See *Lonchocephalus calciferus*.

**Conocephalites(?) contiguus** Matthew.

*Conocephalites(?) contiguus* Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 58, pl. 13, figs. 14a, b.

Canadian (Bretonian Div. C 3a): St. John, New Brunswick.

**CONOCEPHALITES DEVINEI** Matthew. See *Ptychoparia? devinei*.

**CONOCEPHALITES HARTII** Walcott. See *Dikelocephalus harti*.

**CONOCEPHALITES HISINGERI** Matthew. See *Lisania? hisingeri*.

**CONOCEPHALITES MINUTUS** Bradley. See *Ptychoparia minuta*.

**CONOCEPHALITES OWENI** Hall. See *Ptychoparia oweni*.

**CONOCEPHALITES ZENKERI** Billings. See *Ptychoparia zenkeri*.

**CONOCEPHALUS** Burmeister. See *Conocephalites Zenker*.

**CONOCERAS ANGULOSUM** Saemann. See *Actinoceras bigsbyi*.

**CONOCORYPHE (PTYCHOPARIA) GALLATINENSIS** Meek. See *Ptychoparia oweni*.

**CONOKEPHALINA** Brögger.

Genotype: *Conocephalites ornatus* Brögger.

*Conocephalina* Brögger, Geol. Foren. i. Stockholm Forhandl., No. 101, 8, pt. 3, 1886, p. 206.—Walcott, Research in China, 3, Carnegie Inst., Washington, Publ. 54, 3, 1913, p. 137, pl. 13; Smiths. Misc. Coll., 57, 1914, p. 387.

*Conocephalina* Gronwall, Danmarks Geol. Unders. Raekke, 2, No. 13, 1902, p. 150.—Lorenz, Zeits. d. d. geol. Gesell., 58, pt. 2, 1906, p. 64.

**Conocephalina? cristata** (Billings).

*Dikelocephalus cristatus* Billings, Canadian Nat. Geol., 5, 1860, p. 312, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 258; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 404, fig. 381.

*Dicelloccephalus cristatus* Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

*Conocephalina? cristata* Walcott, Smiths. Misc. Coll., 57, 1914, p. 350 (gen. ref.). Ozarkian? (Levis-erratic): Point Levis, Quebec.

**Conocephalina inexpectans** (Walcott).

*Dicelloccephalus inexpectans* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 90, pl. 1, fig. 10.—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

*Dicelloccephalus inexpectatus* Frech, Leth. geog., 1, Th., Leth. Pal., 2, 1897, p. 44, footnote.

*Conocephalina inexpectans* Walcott, Smiths. Misc. Coll., 57, 1914, p. 351 (gen. ref.). Lower Pogonip: Ridge east of Hamburg Ridge, Eureka district, Nevada.

*Cotypes*.—Cat. No. 24564, U.S.N.M.

**Conocephalina megalops** (Billings).

*Dikelocephalus megalops* Billings, Canadian Nat. Geol., 5, 1860, p. 311, fig. 9; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 257; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 403, fig. 380.

*Dicelloccephalus megalops* Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

*Conocephalina megalops* Walcott, Smiths. Misc. Coll., 57, 1914, p. 351 (gen. ref.). Ozarkian? (Levis-erratic): Point Levis, Quebec.

**Conocephalina whitehallensis** (Walcott).

*Conocephalina whitehallensis* Walcott, Smiths. Misc. Coll., 57, 1912, p. 269, pl. 44, figs. 9–11a.



**Conocephallina whitehallensis**—Continued.

Upper Cambrian or Ozarkian (Potsdam): Whitehall, Washington County, New York.

*Holotype* and *paratypes*.—Cat. Nos. 58579–58581, U.S.N.M.

**CONOLICHAS** Dames.

Genotype: *Lichas æquiloba* Steinhardt.

*Conolichas* Dames, Zeits. d. d. Geol. Gesell., 29, 1877, p. 806.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, pp. 30, 40, 87.—Zittel, Handb. Pal., 2, 1885, p. 624.—Hall and Clarke, Pal. New York, 7, 1888, p. xxxix, fig.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 754.—Koken, Die Leitfossilien, Leipzig, 1896, p. 30.—Gurich, Neues Jahrb. f. Min., Geol. Pal., 14, Beilage-Bd., 1901, p. 522, pl. 20, fig. 16.

**Conolichas cornutus** (Clarke).

*Lichas* (*Conolichas*) *cornutus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 749, figs. 72, 73.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 237.

Trenton: Trenton Falls, New York; Lake Winnipeg, Canada.

**CONOPHRYS** *PUSILLA* Brögger. See *Shumardia pusilla*.

**CONOPHYLLUM** Hall. See *Cystiphyllum* Lonsdale.

**CONOTRETA** Walcott.

Genotype: *C. rusti* Walcott.

*Conotreta* Walcott, Proc. U. S. Nat. Mus., 12, 1890, p. 365 (extract 1889).—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 104, 167; 11th Ann. Rep. New York State Geol., 1894, p. 250.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 687.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 308; 2d ed., 1913, p. 376.—Matthew, Trans. Royal Soc. Canada, 2d ser., 7, sec. 4, 1901, p. 94.

**Conotreta rusti** Walcott.

*Conotreta rusti* Walcott, Proc. U. S. Nat. Mus., 12, 1890, p. 365, figs. 1–4 (extract 1889).—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 104, pl. 4K, figs. 16–21.

Trenton: Trenton Falls, New York; Covington, Kentucky.

*Cotypes*.—Cat. No. 18443, U.S.N.M.

**CONOTUBULARIA** Troost. See *Actinoceras* Bronn.

**CONOTUBULARIA** *BRONGNIARTII* Troost. See *Orthoceras brongniarti* Troost.

**CONOTUBULARIA** *CUVIERII* Troost. See *Actinoceras cuvieri*.

**CONOTUBULARIA** *DEFRANCI* Troost. See *Orthoceras defranci*.

**CONOTUBULARIA** *GOLDFUSSI* Troost. See *Orthoceras goldfussi*.

**CONRADELLA** Ulrich and Scofield. See *Phragmolites* Conrad.

**CONRADIA** Hall. See *Dinobolus* Hall.

**CONSTELLARIA** Dana.

Genotype: *Ceriopora constellata* (Van Cleve, MS.), Dana.

*Constellaria* Dana, Zoophyta, 1846, p. 537.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. Mus. d'Hist. Nat., 5), 1851, pp. 154, 278.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 154.—Nicholson, Pal. Ohio, 2, 1875, p. 214; Pal. Tab. Corals, 1879, p. 292.—Zittel, Handb. Pal., 1, 1880, p. 615; Genus *Monticulipora*, 1881, p. 97.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156; 6, 1883, p. 265.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 475.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 29.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 374, 423.—Rominger, Amer. Geol.,

**CONSTELLARIA**—Continued.

- 6, 1890, p. 113.—Ulrich, Geol. Minnesota, 3, 1893, p. 311; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 276.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 117.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 34.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 135.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 218, 219; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 334. *Stellipora* Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 281 (in part).—Dybowski, Die Chætetiden d. Ostbalt, Silur-Form., 1877, p. 42.

**CONSTELLARIA ANTHELOIDEA** Milne-Edwards. See *Constellaria florida*.

*Constellaria constellata* (Van Cleve) Dana.

*Ceriopora constellata* Van Cleve (MS.) Plates of Fossils.

*Constellaria constellata* Dana, Zoophyta, 1846, p. 537, pl. 52, figs. 6, 6a.

Observation.—Van Cleve's illustrations could apply equally well to *C. florida* or *C. polystomella*. His specimens were said to be from the vicinity of Dayton, Ohio, and hence were probably of the latter species. In view of this uncertainty the name had better be dropped.

**CONSTELLARIA CONSTELLATA-PLANA** Nickles and Bassler. See *Constellaria florida plana*.

**CONSTELLARIA CONSTELLATA PROMINENS** Nickles and Bassler. See *Constellaria florida prominens*.

**Constellaria emaciata** (Ulrich and Bassler).

*Constellaria florida* var. *emaciata* Hayes and Ulrich, U. S. Geol. Surv., folio 95, illustration sheet, 1903, fig. 30.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 37.

*Constellaria emaciata* Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 44, pl. 1, figs. 7, 8.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 126.

Trenton: Columbia, Nashville, etc., Tennessee (Bigby and Catheys); Kentucky (Cynthiana).

*Cotypes*.—Cat. No. 43208, U.S.N.M.

**Constellaria fischeri** Ulrich.

*Constellaria fischeri* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 270, pl. 14, figs. 6-6c.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 214.

Trenton: Winchester, etc., Kentucky (Cynthiana); Nashville, etc., Tennessee (Catheys).

*Holotype*.—Cat. No. 44068, U.S.N.M.

**Constellaria florida** Ulrich.

*Constellaria florida* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 257; 6, 1883, p. 267, pl. 14, figs. 2-2f; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 276, fig. 461.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 54, pl. 3, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 136, fig. 188i.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 334, fig. 484.

*Monticulipora* (*Constellaria*) *polystomella* (not Nicholson) James and James, (in part) Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 30; James, *ibid.*, 18, 1896, p. 118.

*Chætetes constellatus* Quenstedt (not Van Cleve) Röhren-und Sternkorallen, 1881, p. 79, pl. 146, figs. 21-25.

*Constellaria constellata* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 213.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 804, pl. 12, figs. 4-4e; pl. 27, fig. 19.



**Constellaria florida**—Continued.

*Stellipora antheloidea* D'Orbigny (not Hall), Prodr. de Pal., 1, 1850, p. 22.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 281.

*Constellaria antheloidea* Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 279, pl. 20, figs. 7, 7b.—Nicholson, Pal. Ohio, 2, 1875, p. 214; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 92, pl. 5, fig. 10.—James, Paleontologist, No. 2, 1878, p. 13.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 476, fig. 116.—Nicholson, Pal. Tab. Corals, 1879, p. 301, pl. 14, figs. 5, 5b.—White, 11th Ann. Rep. Indiana Geol. Nat. Hist. Surv., 1882, p. 379, pl. 46, figs. 1-3.

*Hellipora* (*Constellaria*) *antheloidea* Rominger (not Hall), Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 118.

Maysville (Fairview): Cincinnati, Ohio and vicinity; Tennessee.

*Cotypes*.—Cat. No. 43808, U.S.N.M.

*CONSTELLARIA FLORIDA* var. *EMACIATA* Hayes and Ulrich. See *Constellaria emaciata*.

**Constellaria florida plana** Ulrich.

*Constellaria florida* var. *plana* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 269, pl. 14, fig. 4.

*Constellaria constellata-plana* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 213.

Maysville (Fairview): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43645, U.S.N.M.

**Constellaria florida prominens** Ulrich.

*Constellaria florida* var. *prominens* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 269, pl. 14, fig. 3.

*Constellaria constellata-prominens* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 214.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 806, pl. 27, fig. 18.

*Constellaria prominens* Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 52, pl. 2, fig. 15.

Eden (McMicken) and Maysville (Fairview): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43644, U.S.N.M.

**Constellaria limitaris** (Ulrich).

*Stellipora limitaris* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 126, pl. 12, figs. 8-8c.

*Constellaria limitaris* Ulrich, *ibid.*, 6, 1883, p. 269, pl. 14, fig. 5, 5a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 806, pl. 13, fig. 2; pl. 28, fig. 2.

Richmond (Waynesville-Whitewater): Clarksville, Waynesville, etc., Ohio; Versailles, etc., Indiana.

*Cotypes and plesiotypes*.—Cat. Nos. 43642, 43643, U.S.N.M.

**Constellaria parva** Ulrich.

*Constellaria parva* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 424, pl. 34, figs. 1-1b.

*Monticulipora* (*Constellaria*) *parva* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 119.

Richmond (Fernvale): Wilmington, Illinois.

Sections of *holotype*.—Cat. No. 43747, U.S.N.M.

**Constellaria polystomella** Nicholson.

*Constellaria polystomella* Nicholson, Pal. Ohio, 2, 1875, p. 215, pl. 22, figs. 7, 7a.—Whitfield, Geol. Surv. Wisconsin, 4, 1882, p. 257, pl. 12, figs. 3, 4.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 173, fig.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 214.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 808, pl. 13, figs. 1, 1b; pl. 18, fig. 1.

**Constellarla polystomella**—Continued.

*Stellipora polystomella* Miller, N. A. Geol. Pal., 1889, p. 203, fig. 217.

*Monticulipora* (*Constellarla*) *polystomella* (in part) J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, p. 118.

Richmond: Delafield, Wisconsin (Maquoketa); Wilmington, Illinois (Fernvale); Ohio; Indiana; and Kentucky (Waynesville-Whitewater).

*CONSTELLARIA PROMINENS* Nickles. See *Constellarla florida prominens*.

**Constellarla punctata** (Whitfield).

*Monticulipora punctata* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 71; Geol. Surv. Wisconsin, 4, 1882, p. 249, pl. 11, figs. 3, 4.—Buell, Trans. Wisconsin Acad. Sci., 5, 1882, p. 189.

*Constellarla punctata* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 214.

Richmond (Maquoketa): Delafield and Iron Ridge, Wisconsin.

**Constellarla teres** Ulrich and Bassler.

*Constellarla teres* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 37.—Hayes and Ulrich, U. S. Geol. Surv., fol. 95, illus. sheet, 1903, fig. 31.

Trenton (Bigby and Catheys): Columbia, etc., Tennessee; Kentucky.

*Cotypes*.—Cat. No. 43205, U.S.N.M.

**Constellarla varia** Ulrich.

*Constellarla varia* Ulrich, Geol. Minnesota, 3, pt. 1, 1893, p. 311, pl. 21, figs. 1-7.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 219-221, figs. 120-122.

Trenton: Cannon Falls, etc., Minnesota (Prosser); Belleville, Ontario; Belfast, Tennessee.

Ordovician (Wassaleam and Jewe): Uxnorn and Jewe, Esthonia, Russia.

*Cotypes* and *plesiotypes*.—Cat. Nos. 43546, 57300, 57301, U.S.N.M.

**CONULARIA** Miller.

Genotype: *C. quadrisulcata* Miller.

*Conularia* Miller, in Sowerby's Min. Conchology, 3, 1821, p. 107.—Dekoninck, Desc. Animaux Fossiles, Liege, 1842-1844, 1844, p. 494.—Hall, Pal. New York, 1, 1847, p. 222, footnote.—Sandberger, Neues Jahrb. f. Min., etc., 1847, p. 11.—Brown, Illust. Foss. Conch. Great Britain and Ireland, 1849, p. 43.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 9.—Dana, Wilkes U. S. Expl. Exped., 1838-1842, Geol., 1849, p. 708.—Woodward, Man. Mollusca, pt. 2, 1854, p. 206, fig. 108.—McCoy, British Pal. Rocks and Foss., 1854, p. 287.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 319.—Hall, Pal. New York, 3, 1859, p. 347, and footnote.—Chapman, Expos. Min. Geol. Canada, 1864, p. 122.—Barrande, Syst. Sil. Centre Boheme, 3, 1867, p. 1.—Salter, Cat. Camb. Sil. Foss., 1873, p. 67.—Etheridge, Geol. Mag., 10, 1873, p. 295.—Hall, Pal. New York, 5, pt. 2, 1879, p. 205.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 39.—Zittel, Handb. Pal., 2, 1882, p. 315.—Koninck Ann. Mus. Royal Hist. Nat. Belgium, 8, 1883, p. 219.—Miller, N. A. Geol. Pal., 1889, p. 390; 1st App., 1892, p. 692.—Holm, Sveriges Geol. Unders., Ser. C, No. 112, 1893, p. 113, 154.—Matthew, Canadian Rec. Sci., 5, 1893, p. 433.—A. Ulrich, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 8, 1893, p. 25.—Koken, Die Leitfossilien, Leipzig, 1896, p. 98, fig. 76.—Ruedemann, Amer. Geol., 17, 1896, p. 158; 18, p. 65.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 284.—Pilsbry, Zittel, Eastman Textb. Pal., 1, 1900, p. 490; 2d ed., 1913, p. 572.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 213; Bull. New York State Mus., 45, 1901, p. 213.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 12.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 950.



**Conularia amazonica** Clarke.

*Conularia amazonica* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 20, pl. 2, figs. 23-25.

Silurian: Rio Trombetas, Brazil.

**Conularia asperata** Billings.

*Conularia asperata* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 21.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 201, pl. 21, figs. 2, 2a.

Richmond: Macasty Bay, Anticosti (English Head): Lake Winnipeg, Canada.

**Conularia bifurca** Ringueberg.

*Conularia bifurca* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 18, pl. 2, fig. 11.

Clinton (Rochester): Lockport, New York.

**Conularia bilineata** Foerste.

*Conularia bilineata* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 547, pl. 37A, fig. 12. Upper Medinan (Brassfield): Soldiers Home, near Dayton, Ohio.

**Conularia formosa** Miller and Dyer.

*Conularia formosa* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 38, pl. 1, figs. 12, 12a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 958, pl. 42, fig. 2.

Maysville and Richmond: Versailles, etc., Indiana; Cincinnati, Ohio, and vicinity.

**Conularia gattingeri** Safford.

*Conularia Gattingeri* Safford, Geol. Tennessee, 1869, p. 289.

Trenton: Nashville, Tennessee.

**Conularia gracilis** Hall.

*Conularia gracile* Hall, Pal. New York, 1, 1847, p. 224, pl. 59, figs. 7a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, fig. 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 144, figs.—Ruedemann, Amer. Geol., 17, 1896, pp. 158-165, pl. 18, figs. 1-6; pl. 9, figs. 1-7; 18, pp. 65-71, pl. 2, figs. 1, 2; 15th Rep. State Geol. New York for 1895, 1898, p. 701, pls. 1-4; 49th Rep. New York State Mus., 2, 1898, p. 701, pls. 1-4.

Trenton: Near Middleville and Dolgeville, New York.

**Conularia granulata** Hall.

*Conularia granulata* Hall, Pal. New York, 1, 1847, p. 223, pl. 59, figs. 5a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, figs. 5a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 144, figs.

Trenton: Middleville, New York.

**Conularia hudsoni** Emmons.

*Conularia Hudsoni* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 208, fig. 65; Man. Geol., 1860, p. 103, fig. 93.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 144, text fig.

Cincinnatian (Pulaski): Lorraine, Jefferson County, New York.

**Conularia indentata** Conrad.

*Conularia indentata* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 7, 1854, p. 31.

Trenton: Galena, Illinois.

**Conularia infrequens** Hall.

*Conularia infrequens* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 321, pl. 33, fig. 7; Trans. Albany Inst., 10, 1883, p. 73.

Niagaran (Waldron): Waldron, Indiana.

**Conularia laqueata** Conrad.

*Conularia laqueata* Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 57.—

Hall, 15th Rep. New York State Cab. Nat. Hist., 1861, pl. 11, fig. 20.

Clinton (Rochester): Albion, Wayne County, New York.

**Conularia longa** Hall.

*Conularia longa* Hall, Pal. New York, 2, 1852, p. 295, pl. 65, figs. 2a-d.

Clinton (Rochester): Lockport, New York.

**Conularia magnifica** Spencer.

*Conularia magnifica* Spencer, Canadian Nat., n. s., 9, 1879, p. 63; Trans. Acad.

Sci. St. Louis, 4, 1884, p. 607, pl. 9, figs. 1, 1a, b; Bull. Mus. Univ. State

Missouri, 1, 1884, p. 58, pl. 9, figs. 1a-b.

Niagaran dolomite: Hamilton, Ontario.

**Conularia multipuncta** Ringueberg.

*Conularia multipuncta* Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 18, pl. 2, fig. 10.

Clinton (Rochester): Lockport, New York.

**Conularia niagarensis** Hall.

*Conularia niagarensis* Hall, Pal. New York, 2, 1852, p. 294, pl. 65, figs. 1a-h.—

Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 286, pl. 5, fig. 16; Geol.

Surv. Ohio, Pal., 7, 1898, p. 547, pl. 30, fig. 16.—Grabau, Bull. New York

State Mus., 45, 1901, p. 214, fig. 145; Bull. Buffalo Soc. Nat. Sci., 7, 1901,

p. 214, fig. 145.

Early Silurian: Lockport, etc., New York (Rochester); Dayton, Ohio (Brassfield).

**Conularia papillata** Hall.

*Conularia papillata* Hall, Pal. New York, 1, 1847, p. 223, pl. 59, figs. 6a, b.—

Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, fig. 6.—Lesley, Geol.

Surv. Pennsylvania, Rep. P 4, 1889, p. 145, figs.

Trenton: Near Middleville, New York.

**Conularia quadrata** Walcott.

*Conularia quadrata* Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, p. 93; mus. ed., 1879, p. 93.

Trenton: Prospect Bridge, Oneida County, New York.

**Conularia quadrisulcata** (Miller?) Hall.

*Conularia quadrisulcata* Miller in Sowerby's Min. Conch., 3, 1821, p. 107.—Hall,

Geol. New York, 4, 1843, p. 110, fig. 2; p. 111, tab. ill. 17, fig. 2.—Yandell

and Shumard, Cont. Geol. Kentucky, 1847, p. 15.—Lesley, Geol. Surv.

Pennsylvania, Rep. P 4, 1889, p. 145, fig.—Miller, N. A. Geol. Pal., 1889, p.

390, fig. 644.

Silurian: Europe; Lockport, Rochester, etc., New York (Niagaran).

**Conularia rugosa** Spencer.

*Conularia rugosa* Spencer, Bull. Missouri State Mus., 1, 1884, p. 59, pls. 8, 9, figs. 2, 2a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 608, pls. 8, 9, figs. 2, 2a.

Niagaran dolomite: Hamilton, Ontario.

**Conularia splendida** Billings.

*Conularia splendida* Billings, Cat. Sil. Foss Anticosti, Geol. Surv. Canada, 1866, p. 21.

Richmond (Charleton): Charleton Point, Anticosti.



**Conularia transversa** Ringueberg.

*Conularia transversa* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 19, pl. 2, fig. 12.

Clinton (Rochester): Lockport, New York.

**Conularia trentonensis** Hall.

*Conularia trentonensis* Hall, Pal. New York, 1, 1847, p. 222, pl. 59, figs. 4a-f.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, figs. 4a-f.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 609.—Hall, Pal. New York, 3, 1859, p. 347-348.—Chapman, Canadian Jour., n. s., 7, 1862, p. 118, fig. 116; 8, 1863, p. 199, fig. 191; Expos. Min. Geol. Canada, 1864, p. 122, fig. 116; p. 171, fig. 191.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 578.—Ami, Trans. Ottawa Field Nat. Club, 1, 1882, p. 64.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 167, fig.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 146, 2 figs.—Ruedemann, Bull. New York State Mus., 8, 1901, p. 520.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 188, pl. 3, figs. 7, 8. Trenton: Middleville, Trenton Falls, etc., New York; Canada; Iowa; New Jersey; etc.

**Conularia trentonensis multicosta** Ruedemann.

*Conularia trentonensis* var. *multicosta* Ruedemann, Bull. New York State Mus., 162, 1912, p. 115.

Trenton: Watervliet, New York (Snake Hill); Schoharie Junction and Schenectady, New York (Schenectady).

**Conularia trentonensis rogersensis** Foerste.

*Conularia trentonensis rogersensis* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 142, pl. 1, fig. 16.

Trenton (Upper): Rogers Gap, Kentucky.

**Conularia triangulata** Raymond.

*Conularia triangulata* Raymond, Amer. Jour. Sci., 4th ser. 20, 1905, p. 379; Ann. Carnegie Mus., 4, 1908, p. 216, pl. 54, fig. 18.

Chazy (Valcour): Valcour Island, New York.

**Conularia wilkinsi** Spencer.

*Conularia wilkinsi* Spencer, Bull. Missouri State Mus., 1, 1884, p. 59, pl. 8, fig. 3; Trans. Acad. Sci. St. Louis, 4, 1884, p. 609, pl. 8, fig. 3.

Niagaran dolomite: Hamilton, Ontario.

**CORALLIDOMUS** Whitfield.

Genotype: *C. concentricus* Whitfield.

*Corallidomus* Whitfield, Geol. Surv. Ohio, Pal., 7, 1893, p. 493.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 780.

**Corallidomus concentricus** Whitfield.

*Corallidomus concentricus* Whitfield, Geol. Surv. Ohio, Pal., 7, 1893, p. 493, pl. 13, fig.; Ulrich, *ibid.*, pl. 55, figs. 15, 16.

Richmond (Liberty): Brown County, Ohio.

**CORALLIUM GOTHLANDICUM** Linnæus. See *Favosites gothlandica*.**CORDYLOCRINUS** Angelin.

Genotype: *C. comtus* Angelin.

*Cordylocrinus* Angelin, Icon. Crinoid, 1878, p. 3, pl. 23, fig. 6.—Zittel, Handb. Pal., 1, 1879, p. 365.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, pp. 232, 234 (Rev. Pal., pt. 2, pp. 58, 60); 1886, p. 337; 1890, p. 353.—Miller, N. A. Geol. Pal., 1889, p. 234.—Treatise on Zool. (Lankester), pt. 3, 1900, p. 156.—Zittel, Grundzuge Pal., 1, 1910, p. 157.

**Cordylocrinus? dubius** Rowley.

*Cordylocrinus? dubius* Rowley, Amer. Geol., 34, 1904, p. 272, pl. 16, figs. 20-22.  
Niagaran (Bainbridge): Near St. Mary's, Ste. Genevieve County, Missouri.

**CORDYLOCRINUS PARVUS** Wachsmuth and Springer. See *Cordylocrinus plumosus*.

**Cordylocrinus plumosus** (Hall).

*Platycrinus plumosus* Hall, Pal., New York, 3, 1859, pp. 113, 148, pl. 4, figs. 1-5.

*Platycrinus parvus* Hall, Pal., New York, 3, 1859, p. 114, pl. 4, figs. 6-9.

*Cordylocrinus plumosus* Wachsmuth and Springer, Rev. Pal., pt. 2, 1881, p. 61;  
Proc. Acad. Nat. Sci. Philadelphia, 33, 1882, p. 235; N. Amer. Cri. Cam., 2,  
1897, p. 737; Atlas, pl. 75, fig. 20.—Talbot, Amer. Jour. Sci., 20, 1905, p. 28,  
fig. 3, pl. 3, figs. 2, 4.

*Cordylocrinus parvus* Wachsmuth and Springer, Rev. Pal., pt. 2, 1881, p. 60;  
Proc. Acad. Nat. Sci. Philadelphia, 33, 1882, p. 234; N. Amer. Crin. Cam.,  
2, 1897, p. 737.

*Clematocrinus plumosus* Jaekel, Zeit. d. d. Geol. Gesell., 49, 1897, Verhandl.,  
p. 47.

*Clematocrinus parvus* Jaekel, *ibid.*, p. 737.

Helderbergian (Manlius transition beds or Coeymans): Jerusalem Hill and North  
Litchfield, New York.

**COREMATOCLADUS** Ruedemann.

Genotype: *C. densa* Ruedemann.

*Corematocladus* Ruedemann, Bull. New York State Mus., 133, 1909, p. 205.

**Corematocladus densa** Ruedemann.

*Corematocladus densa* Ruedemann, Bull. New York State Mus., 133, 1909, p.  
206, pl. 3, figs. 1-5.

Black River (Lowville): Glens Falls, New York.

**CORNULITES** Schlotheim.

Genotype: *C. serpularius* Schlotheim.

*Cornulites* Schlotheim, Petrefaktenkund, 1820, p. 378.—McCoy, Brit. Pal. Rocks  
and Foss., 1854, p. 63.—Barrande, Syst. Sil. Centre Boheme, 3, 1867, p. 167.—  
Nicholson, Amer. Jour. Sci., 3d ser., 3, 1872, pp. 202, 204.—Hall, Pal. New  
York, 5, pt. 2, 1879, p. 164.—Zittel, Handb. Pal., 1, 1879, p. 564.—Vine,  
Quart. Jour. Geol. Soc. London, 38, 1882, pp. 378, 379.—Hall, Pal., New York,  
7, sup. 1888, p. 8.—Miller, N. A. Geol. Pal., 1889, p. 517.—Grabau, Bull.  
Buffalo Soc. Nat. Sci., 6, 1899, p. 150.—Hinde, Zittel-Eastman Textb. Pal.,  
1, 1900, p. 253.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 161; Bull.  
New York State Mus., 45, 1901, p. 161.—Grabau and Shimer, N. A. Index  
Fossils, 2, 1910, p. 238.—Zittel-Eastman Textb., Pal., 2d ed., 1913, p. 139.

*Conchicolites* Nicholson, Amer. Jour. Sci., 3d ser., 3, 1872, pp. 203-204; Geol.  
Mag., 10, 1873, p. 54; Cincinnati Quart. Jour. Sci., 1, 1874, p. 236.—Miller,  
Cincinnati Quart. Jour. Sci., 1, 1874, p. 7, p. 238.—Zittel, Handb. Pal., 1,  
1879, p. 564.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 260.—  
Vine, Quart. Jour. Geol. Soc. London, 38, 1882, pp. 378, 381.—Miller, N. A.  
Geol. Pal., 1889, p. 517.—Grabau and Shimer, N. A. Index Fossils, 2, 1910,  
p. 237.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 139 (Genotype *C. gre-*  
*garius* Nicholson).

*Ortonia* Nicholson, Geol. Mag., 9, 1872, pp. 447, 448; Rept. 42d Meeting Brit.  
Assoc. Adv. Sci., Notes and Abstracts, 1873, p. 119; Cincinnati Quart. Jour.  
Sci., 1, 1874, p. 236.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 9, 10.  
238.—Zittel, Handb. Pal., 1, Munich, 1879, p. 564.—Etheridge, Geol. Mag.,  
dec. 2, 7, 1880, p. 366.—Vine, Quart. Jour. Geol. Soc. London, 38, 1882, pp.  
378.—Nicholson, Rept. Pal. Prov. Ontario, pt. 1, 1874, p. 122.—Grabau and  
Shimer, N. A. Index Fossils, 2, 1910, p. 239.—Zittel-Eastman Textb. Pal.,  
2d ed., 1913, p. 139 (Genotype *O. conica* Nicholson).



**Cornulites arcuatus** Conrad.

*Cornulites arcuatus* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 276, pl. 17, fig. 8.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 109, fig. 3; p. 110; tab. ill. 16, fig. 3.—Emmons, Man. Geol., 1860, p. 108, fig. 98.—Hall, Pal. New York, 7, Sup., 1888, p. 19, pl. 116A, fig. 9.—Miller, N. A. Geol. Pal., 1889, p. 518, fig. 937.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 105, pl. 4, figs. 1-5.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 201, pl. 22, figs. 4-6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 239, fig. 1524.

Silurian (Lockport-Guelph, Cobleskill): Albion, Orleans County, etc., New York.

Upper Monroan (Amherstburg): Detroit River, opposite Amherstburg, Ontario.

**Cornulites bellistriatus** Hall.

*Cornulites* ——— Hall, Pal. New York, 2, 1852, p. 353, pl. 85, figs. 12-17.

*Cornulites bellistriatus* Hall, Pal. New York, 7, Sup., 1888, p. 20, pl. 116A, figs. 12, 13.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 161, fig. 56; Bull. New York State Mus., 45, 9, 1901, p. 161, fig. 56.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238, fig. 1523.

Clinton (Rochester): Western New York; Ontario.

**Cornulites cingulatus** Hall.

*Cornulites cingulatus* Hall, Pal. New York, 7, 1888, p. 20 (supplement to 5), pl. 114, fig. 29.—Clarke, Mem. New York State Mus., 3, No. 3, 1900, p. 27, pl. 2, figs. 35-38.—Weller, Geol. Surv. New Jersey Pal., 3, 1903, p. 272, pl. 32, fig. 3.—Ohern, Maryland Geol. Surv., Low. Dev., 1913, p. 258, pl. 40, fig. 16.

Helderbergian: New York (New Scotland); Pinto, Maryland (Keyser); New Jersey. Also Oriskany of New York.

**Cornulites clintoni** Hall.

*Cornulites flexuosus* Hall (not Hall, 1847), Pal. New York, 2, 1852, p. 98, pl. 28, fig. 12a-e; 5, pt. 2, 1879, p. 156, footnote; 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 184.

*Cornulites clintoni* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 330; Pal. New York, 7, Sup., 1888, p. 18, pl. 116, fig. 22; pl. 116A, fig. 9.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 10.

*Cornulites serpularius* var. *clintoni* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 274, pl. 5, fig. 8, pl. 7, fig. 8.

Clinton: Lockport, etc., New York; Hamilton, etc., Ontario (Irondequoit and Rochester); Lewis County, Kentucky.

**Cornulites clintoni gracilis** (Hall).

*Cornulites flexuosus* var. *gracilis* Hall, Canadian Nat. Geol., 5, 1860, p. 155.—Dawson, Acadian Geol., 2d ed., 1868, p. 606.

Silurian: Arisaig, Nova Scotia.

**Cornulites contus** (Nicholson).

*Ortonia conica* Nicholson, Geol. Mag., 9, 1872, pp. 447, 448, fig. 1; Rep. 42d Meeting Brit. Assoc. Adv. Sci., Notes and Abstracts, 1873, p. 119.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 11, fig. 4.—Hall, Pal. New York, 7, Sup., 1888, p. 17, pls. 115, fig. 27; 116A, figs. 15, 16.

Maysville: Cincinnati, Ohio, and vicinity.

**Cornulites contractus** Ringueberg.

*Cornulites contractus* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 148, pl. 3, fig. 6.

Clinton (Rochester): Lockport, New York.

**Cornulites corrugatus** (Nicholson).

- Conchicolites corrugatus Nicholson, Geol. Mag., 10, 1873, p. 55, pl. 4, fig. 2.—  
 Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 7.—Hall, Pal. New York, 7,  
 Sup., 1888, p. 17, pls. 115, fig. 27; 116A, figs. 17, 18.—Grabau and Shimer,  
 N. A. Index Fossils, 2, 1910, p. 237, fig. 1522.  
 Maysville: Cincinnati, Ohio, and vicinity.

**Cornulites distans** Hall.

- Tentaculites distans Hall, Pal. New York, 2, 1852, p. 184, pl. 41A, figs. 9, a, b.—  
 Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 144.—Nicholson,  
 Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 48.  
 Cornulites distans Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed.,  
 1879, p. 185; Pal. New York, 5, pt. 2, 1879, p. 163 (gen. ref.); 11th Ann. Rep.  
 Indiana Dep. Geol. Nat. Hist., 1882, p. 330 (gen. ref.); Pal. New York, 7,  
 Sup., 1888, p. 18, pl. 116, fig. 23.—Foerste, Proc. Boston Soc. Nat. Hist., 24,  
 1889, p. 274, pl. 5, fig. 7; pl. 6, figs. 10, 11; Geol. Surv. Ohio Pal., 7, 1893, p.  
 532, pl. 30, fig. 7; pl. 31, figs. 10, 11.—Miller, N. A. Geol. Pal., 1889, p. 518,  
 fig. 938.  
 Upper Medinan: Flamborough Head, etc., Ontario (Cataract); Dayton, Ohio  
 (Brassfield); Arisaig, Nova Scotia.

**Cornulites flexuosus** (Hall).

- Tentaculites? flexuosa Hall, Pal. New York, 1, 1847, p. 92, pl. 29, figs. 6a-d; p.  
 284, pl. 78, fig. 2a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 225, pl. 17,  
 fig. 6.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 76.—  
 Emmons, Man. Geol., 1860, p. 102, fig. 6.—Meek and Worthen, Proc. Acad.  
 Nat. Sci. Philadelphia, 1865, p. 255; Geol. Surv. Illinois, 3, 1868, p. 343.  
 Cornulites flexuosus Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882,  
 p. 330; Pal. New York, 7, Sup., 1888, p. 18, pl. 115, figs. 41, 42.—Cumings,  
 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1067, pl. 32, fig. 11.  
 Conchicolites flexuosus Miller, N. A. Geol. Pal., 1889, p. 517, fig. 936.  
 Trenton: Lowville, New York.  
 Cincinnati: Turin, Pulaski, etc., New York (Pulaski); Cincinnati, Ohio, and  
 vicinity (Maysville).

CORNULITES FLEXUOSUS Hall (part). See Cornulites clintoni.

CORNULITES FLEXUOSUS var. GRACILIS Hall. See Cornulites clintoni gracilis.

**Cornulites gregarius** (Nicholson).

- Conchicolites gregarius Nicholson, Man. Pal., 1, 1889, p. 477, fig. 342; Amer. Jour.  
 Sci., 3d ser., 3, 1872, p. 204.—Grabau and Shimer, N. A. Index Fossils, 2, 1910,  
 p. 238.  
 Ordovician: England; Cincinnati, Ohio(?).

**Cornulites immaturus** Hall.

- Cornulites immaturus Hall, Pal. New York, 7, Sup., 1888, p. 18, pl. 115, fig. 40.  
 Utica: Holland Patent, Oneida County, New York.

**Cornulites incurvus** (Shumard).

- Tentaculites incurvus Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, pt. 2,  
 1855, p. 195, pl. B, fig. 6a, b.—Keyes, Missouri Geol. Surv., 5, 1894, p. 217,  
 pl. 35, fig. 3.  
 Cornulites incurvus Hall, Pal. New York, 7, Sup., 1888, p. 18, pls. 115, fig. 31;  
 pl. 116, fig. 31.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 41, pl. 2,  
 fig. 7.  
 Upper Medinan (Girardeau): Near Cape Girardeau, Missouri.



**Cornulites minor** (Nicholson).

*Ortonia minor* Nicholson, Geol. Mag., 10, 1873, p. 56, pl. 4, fig. 3.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 10.—Hall, Pal. New York, 7, Sup., 1888, p. 17, pl. 115, fig. 3; pl. 116A, figs. 19, 20.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 240, fig. 1525c.

*Conchicolites minor* Miller, N. A. Geol. Pal., 1889, p. 517.

Maysville: Cincinnati, Ohio, and vicinity.

**Cornulites nodosus** Ringueberg.

*Cornulites nodosus* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 149, pl. 3, fig. 7.

Clinton (Rochester): Lockport, New York.

**Cornulites proprius** Hall.

*Cornulites proprius* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 31, figs. 1-13; mus. ed., 1879, p. 182, pl. 31, figs. 1-13; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 327, pl. 32, figs. 1-13; Pal. New York, 7, Sup., 1888, p. 19, pl. 116, figs. 1-21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238, fig.

Niagaran: Waldron, etc., Indiana; Tennessee (Waldron); Nova Scotia.

**Cornulites richmondensis** (Miller).

*Tentaculites Richmondensis* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 234, fig. 28.—Hall, Pal. New York, 5, pt. 2, 1879, p. 163; 7, Sup., 1888, p. 18, pl. 115, figs. 28-30, 33-39.—Miller, N. A. Geol. Pal., 1889, p. 393, fig. 650.

*Cornulites richmondensis* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1065, pl. 42, fig. 5.

Richmond (Whitewater): Richmond, etc., Indiana.

Observation.—Compare *C. sterlingensis* Meek and Worthen.

**CORNULITES SERPULARIS** var. **CLINTONI** Foerste. See *Cornulites clintoni*.

**Cornulites sterlingensis** (Meek and Worthen).

*Tentaculites Sterlingensis* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 255; Geol. Surv. Illinois, 3, 1868, p. 343, pl. 4, fig. 8.—Hall, Pal. New York, 5, pt. 2, 1879, p. 163; 7, Sup., 1888, p. 17, pl. 115, figs. 5-7, 32.

Richmond (Maquoketa): Sterling, Illinois.

**Cornulites tenuistriatus** (Meek and Worthen).

*Tentaculites tenuistriatus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 254; Geol. Surv. Illinois, 3, 1868, p. 341, pl. 4, figs. 7a, b.

*Cornulites tenuistriatus* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1066.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 41, pl. 2, fig. 6.

Upper Medinan (Girardeau): Alexander County, Illinois.

?Richmond: Richmond, Indiana.

**CORYDOCEPHALUS** Hawle and Corda.

Genotype: *C. flabellatus* Hawle and Corda.

*Corydocephalus* Hawle and Corda, Abh. d. k. Bohmischen Gesell. d. Wiss., 5 (extract), 1847, p. 139, pl. 7, fig. 74.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 61-63, sec. A, pp. 70, 81, 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 309.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 721.

**Corydocephalus byrnesanus** (Miller and Gurley).

*Lichas byrnesanus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 78, pl. 8, figs. 8, 9.

Niagaran (Laurel): Near Madison, Indiana.

**Corydocephalus depauperatus** (Van Ingen).

*Arges phlyctainoides depauperatus* Van Ingen, School of Mines Quart., 23, 1901, p. 57.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**Corydocephalus phlyctainoides** (Green).

*Calymene phlyctainoides* Green, Amer. Jour. Sci., 32, 1837, p. 167.

*Arges phlyctainoides* Hall, Pal. New York, 2, 1852, p. 314, pl. 70, figs. 2a-2c.—Van Ingen, School of Mines Quart., 23, 1901, p. 57, pl., figs., 18, 18a.

*Lichas hanoverensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 78, pl. 8, figs. 6-7.

*Lichas phlyctainoides* Foerste, Geol. Surv. Ohio Pal., 7, 1893, p. 529, pl. 37A, fig. 15; pl. 27, fig. 11.

*Corydocephalus phlyctainoides* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 234, pl. 22, figs. 1-4.

*Corydocephalus phlyctainoides* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 310, fig. 1621b-e.

Niagaran: Springfield, Ohio; Indiana; New York; Illinois; Arkansas.

*Plesiotype*: Cat. No. 4918, U. S. N. M. (Green).

**Corydocephalus ptyonurus** (Hall and Clarke).

*Lichas (Dicranogmus) ptyonurus* Hall and Clarke, Pal. New York, 7, 1888, p. 86, pl. 19B, figs. 19-21.

Cayugan (Cobleskill): Schoharie, New York.

**Corydocephalus tuberculatus** (Weller).

*Arges tuberculatus* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 199, pl. 15, figs. 11-13.

Trenton: Near Iliff's Pond, New Jersey.

**Corydocephalus wesenbergensis paulianus** (Clarke).

*Lichas (Arges) wesenbergensis* var. *paulianus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 744, figs. 62-64.

*Lichas paulianus* Miller, N. A. Geol. Pal., 2d App., 1897, p. 788 (gen. ref.).

Trenton (Prosser): St. Paul and Wykoff, Minnesota.

**CORYMBOCRINUS** Angelin.

Genotype: *Eucalyptocrinus polydorus* McCoy.

*Corymbocrinus* Angelin, Icon. Crinoid., 1878, p. 18, pl. 8, figs. 1, 6-12; pl. 21, fig.

17.—Zittel, Handb. Pal., 1, 1879, p. 373.—Wachsmuth and Springer, Proc.

Acad. Nat. Sci. Philadelphia, 1881, p. 308 (Rev. Pal., pt. 2, p. 134); 1885, p.

328.—Weller, Jour. Geol., 6, 1898, p. 700; Bull. Chicago Acad. Sci., Nat.

Hist. Surv., 4, pt. 1, 1900, p. 99, fig. 45.—Wachsmuth, Zittel-Eastman Textb.

Pal., 1, 1900, p. 147.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p.

162.—Zittel, Grundzuge Pal., 1, 1910, p. 163.

**Corymbocrinus chicaoensis** Weller.

*Corymbocrinus chicaoensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 100, pl. 4, figs. 1-3.

Niagaran (Racine): Chicago, Cicero, and Romeo, Illinois.

**Corymbocrinus niagarensis** Weller.

*Corymbocrinus niagarensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 101, pl. 4, figs. 4, 5.

Niagaran (Racine): Chicago, Illinois.

**CORYNOGRAPTUS** Hopkinson. See *Corynoides* Nicholson.



**CORYNOIDES** Nicholson.Genotype: *C. calicularis* Nicholson.

*Corynoides* Nicholson, Geol. Mag., 4, 1867, p. 108; Mon. British Grapt., 1872, p. 132.—Zittel, Handb. Pal., 1879, p. 289.—Nicholson and Lydekker, Man. Pal., 1887, p. 215.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 228-234.

*Corynograptus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 633.

**Corynoides calicularis** Nicholson.

Graptolite germs Hall, Pal. New York, 3, 1859, p. 508, fig. 7; Can. Org. Rem., dec. 2, 1865, pl. B, fig. 19.

*Corynoides calicularis* Nicholson, Geol. Mag., 4, 1867, p. 108; pl. 7, figs. 9-11.—Hopkinson, Geol. Mag., 9, 1872, p. 502.—Nicholson, Mon. British Grapt., 1872, p. 132, fig.; Ann. Mag. Nat. Hist., 11, 1873, p. 143.—Lapworth, Cat. West. Scot. Foss., 1876, p. 7, pl. 4, fig. 91; Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, App., 1877, pl. 7, fig. 18.—Linnarsson, Sveriges Geol. Unders., ser. C, No. 31, 1879, p. 18.—Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, p. 177.—Nicholson and Lydekker, Man. Pal., 1889, p. 215, fig. 96.—Gurley, Jour. Geol., 4, 1896, pp. 94, 301.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 515.—Clarke, Geol. Mag., 4th ser., 9, 1902, p. 498.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 214, pl. 16, figs. 12, 13.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 234-237, figs. 122-132; pl. 13, figs. 1, 6-8.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 7, figs. 9, 10.

Chazyan: (Normanskill): Glenmont, Albany, and other localities in slate belt of New York; Pennsylvania; Maryland; Virginia.

Ordovician: Wales; Scotland; Scandinavia.

**Corynoides curtus** Lapworth.

*Corynoides curtus* Lapworth, Cat. West. Scot. Foss., 1876, p. 7, pl. 4, fig. 92; Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, App., 1877, pl. 7, fig. 19.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 514ff; Mem. New York State Mus., 11, pt. 2, 1908, pp. 240, 241, figs. 140-144; pl. 13, figs. 4, 17-21. Trenton (Snake Hill): Albany, Amsterdam, etc., New York; Panton, Vermont. Ordovician (Hartfell): Ireland.

**Corynoides curtus comma** Ruedemann.

*Corynoides curtus* Ruedemann, Bull. New York State Mus., 42, 1901, p. 526.

*Corynoides curtus* var. *comma* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 242, pl. 13, figs. 5, 22-24, 145-148.

Trenton (Snake Hill): Mechanicsville, New York.

**Corynoides gracilis** Hopkinson.

*Corynoides gracilis* Hopkinson, Geol. Mag., 9, 1872, p. 502, pl. 12, fig. 1.—Lapworth, Cat. West. Scot. Foss., 1876, p. 7, pl. 4, fig. 93.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 237-239, figs. 133-135; pl. 13, figs. 2, 2, 12, 15, 16.

Ordovician: Scotland (Hartfell); Lansingburg, Troy, and Baker Falls, New York (Trenton-Snake Hill).

**Corynoides gracilis perungulatus** Ruedemann.

*Corynoides gracilis* mut. *perungulatus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 239-240, figs. 136-139; pl. 13, figs. 3, 9, 10, 11, 13, 14.

Chazyan (Normanskill): Glenmont, Speigletown, near Troy, and Mount Moreno, near Hudson, New York; Arkansas.

**CORYNOTRYPA** Bassler.Genotype: *Hippothoa delicatula* James.*Stomatopora* (part) of authors.*Corynotrypa* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 501; Bull. U. S. Nat. Mus., 77, 1911, p. 61; Zittel-Eastman Textb. Pal., 1913, p. 319.**Corynotrypa abrupta** Bassler.*Corynotrypa abrupta* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 517, figs. 16, 17; Bull. U. S. Nat. Mus., 77, 1911, pp. 65, 66, figs. 11, 12.

Richmond (Maquoketa): Iron Ridge, Wisconsin.

Lyckholm limestone: Kertel, Island of Dago, Baltic Sea.

*Holotype* and *paratype*.—Cat. Nos. 54173, 57109, U.S.N.M.**Corynotrypa barberi** Bassler.*Corynotrypa barberi* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 509, fig. 8; Bull. U. S. Nat. Mus., 77, 1911, pp. 63, 64, fig. 9.

Chazy (Ottosee): Knoxville, etc., Tennessee; southwest Virginia.

Lyckholm limestone: Hohenholm, Island of Dago, Baltic Sea.

*Holotype* and *paratype*.—Cat. No. 57105, 57106, U.S.N.M.**Corynotrypa canadensis** (Whiteaves).*Stomatopora canadensis* Whiteaves, Pal. Foss., 3, 1897, p. 161, pl. 18, figs. 4, 4a.*Corynotrypa canadensis* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 526, fig. 27.

Black River or Richmond: Little Black Island, Lake Winnipeg, Canada.

**Corynotrypa curta** Bassler.*Corynotrypa curta* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 518, fig. 18.

Richmond (Maquoketa): Savannah, Illinois.

*Cotypes*.—Cat. No. 54171, U.S.N.M.**Corynotrypa delicatula** (James).*Hippothoa delicatula* James, Paleontologist, No. 1, 1878, p. 6.*Stomatopora proutana* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 39, pl. 1, figs. 4-4b.—Ulrich, *ibid.*, 12, 1890, p. 175, fig. 2c; Geol. Minnesota, 3, 1893, p. 117, pl. 1, figs. 8-12.*Rhopalonaria pertenuis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv., Minnesota, 1886, p. 59.*Stomatopora delicatula* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 419.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 118, fig. 178b.—Bassler, Proc. U. S. Nat. Mus., 30, 1908, p. 55, pl. 3, figs. 4-7.*Stomatopora tenuissima* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 175, fig. 2; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 261, fig. 412A; Geol. Minnesota, 3, pt. 1, 1893, p. 116, pl. 1, figs. 16, 17.*Stomatopora delicatula-tenuissima* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 419.*Corynotrypa delicatula* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 506, figs. 3a, 4-7; Bull. U. S. Nat. Mus., 77, 1911, pp. 61-63, fig. 8; Zittel-Eastman Textb. Pal., 1913, p. 319, figs. 439a.

Stones River-Richmond: Various localities in the United States and Canada.

Middle Ordovician: Esthonia, Russia.

*Plesiotrypes*.—Cat. Nos. 13615, 43260, 43263, 54156, 54165, U.S.N.M.**Corynotrypa dissimilis** (Vine).*Aulopora* sp. Hall, Pal. New York, 2, 1852, pl. 50, figs. 27, 29.*Stomatopora dissimilis* Vine, Quart. Jour. Geol. Soc. London, 37, 1881, pp. 615, 616, figs. 1-8; 38, 1882, p. 50.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 15, 16, pl. 4, figs. 15-19.



**Corynotrypa dissimilis**—Continued.

*Corynotrypa dissimilis* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 523, figs. 23, 24;  
Bull. U. S. Nat. Mus., 77, 1911, pp. 68, 69, fig. 14.

*Stomatopora recta* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 20, pl. 2,  
pp. 15, 15a.

*Stomatopora minor* Hennig, Archiv fur Zool., Kongl. Sven. Vet.-Akad. Stockholm,  
3, No. 10, 1906, p. 24, pl. 3, fig. 6.

Silurian: England, Gotland, and Esthonia; Island of Anticosti; New York and  
Ontario (Rochester); Indiana, Kentucky, and Tennessee (Osgood-  
Louisville).

*Plesiotype*s.—Cat. Nos. 35473, 35475, 57112, U.S.N.M.

**Corynotrypa elongata** (Vine).

*Stomatopora dissimilis* var. *elongata* Vine, Quart. Jour. Geol. Soc. London, 38,  
1882, p. 50.

*Stomatopora elongata* Vine, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 85, fig.  
4, 2.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 14, 15, pl. 4, figs. 10–14.

*Corynotrypa elongata* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 510, fig. 9.

*Stomatopora parva* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 20, pl.  
2, fig. 16.

Silurian: Shropshire, England (Wenlock); Sevenmile Creek, near Eaton, Ohio  
(Brassfield); Rochester and Lockport, New York (Rochester); Newsom, Ten-  
nessee (Waldron); Island of Anticosti.

*Plesiotype*s.—Cat. Nos. 35475, 57107, U.S.N.M.

**Corynotrypa inflata** (Hall).

*Alecto inflata* Hall, Pal. New York, 1, 1847, p. 77, pl. 26, figs. 7a, b.

*Hippothoa inflata* Nicholson, Pal. Ohio, 2, 1875, p. 268, pl. 25, figs. 1–1b; Rep.  
44th Meeting British Assoc. Adv. Sci., Notes and Abstracts, 1875, p. 90.—  
Vine, Rep. 51st Meeting British Assoc. Adv. Sci., 1882, p. 163.

*Stomatopora inflata* Vine, Quart. Jour. Geol. Soc. London, 37, 1881, p. 615.—  
Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 176, fig. 3c; Geol. Minne-  
sota, 3, 1893, p. 117, pl. 1, figs. 13–21; Zittel's Textb. Pal. (Engl. ed.), 1896,  
fig. 412B (p. 261).—Simpson, 14th Ann. Rep. State Geol. New York for  
1894, 1897, figs. 202–204 (p. 597).—Ruedemann, Bull. New York State  
Mus., 49, 1902, p. 12, pl. 1, figs. 2, 3.—Grabau and Shimer, N. A. Index  
Fossils, 1, 1907, p. 118, fig. 178a.—Cumings, 32d Ann. Rep. Geol. Nat. Res.  
Indiana, 1908, p. 886, pl. 32, figs. 1, 1a.

*Stomatopora inflata* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1106,  
figs.

*Corynotrypa inflata* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 515, figs. 12–14;  
Bull. U. S. Nat. Mus., 77, 1911, pp. 64, 65, fig. 10; Zittel-Eastman Textb.  
Pal., 1913, p. 319, fig. 439b.

Black River-Richmond: Trenton Falls, etc., New York; Canada; Minnesota;  
Kentucky; Tennessee; etc.

Middle Ordovician (Wesenberg): Esthonia, Russia.

*Plesiotype*s.—Cat. Nos. 54146, 54162, 54169, U.S.N.M.

**Corynotrypa medialis** Bassler.

*Corynotrypa medialis* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 519, fig. 19.

Richmond (Maquoketa): Three miles north of Spring Valley, Minnesota.

*Holotype*—Cat. No. 57110, U.S.N.M.

**Corynotrypa tennesseensis** Bassler.

*Corynotrypa tennesseensis* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 525, fig. 25.

Stones River (Pierce): Near Murfreesboro, Tennessee.

*Cotype*s.—Cat. No. 54177, U.S.N.M.

**Corynotrypa turgida** (Ulrich).

*Stomatopora turgida* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 176, fig. 3; Geol. Minnesota, 3, 1893, p. 118, pl. 1, figs. 22, 23.

*Corynotrypa turgida* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 520, fig. 20.

Richmond (Fernvale): Wilmington, Illinois.

*Holotype* and *plesiotype*.—Cat. Nos. 43258, 54155, U.S.N.M.

**COSCINIUM PROAVUS** Eichwald. See *Graptodictya proava*.

**COSCINOPORA SULCATA** Owen. See *Receptaculites oweni*.

**CRANIA** Retzius.

Genotype: *Anomia craniolaris* Linnæus.

*Crania* Retzius, Schrift. Ges. Naturf. Freunde, Berlin, 2, 1871, p. 72.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 273.—Davidson, British Foss. Brach., Pal. Soc., 1853, pp. 37, 122.—Woodward, Man. Mollusca, pt. 2, 1854, p. 236, figs. 157, 159.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 66.—Davidson, Mon. British Carb. Brach., Pal. Soc., 1861, p. 192.—Dall, Amer. Jour. Conch., 7, 1871, p. 71; Bull. Mus. Comp. Zool., 3, 1871, p. 27.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, pp. 11, 12.—Dall, Bull. U. S. Nat. Mus., 8, 1877, p. 21.—Winchell, 8th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1880, p. 63.—Miller, N. A. Geol. Pal., 1889, p. 341.—Nettelroth, Kentucky Foss. Shells, Mem. Geol. Surv. Kentucky, 1889, p. 31.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 145, 169.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 372.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 260.—Koken, Die Leitfossilien, Leipzig, 1896, p. 232, figs. 191, 1-3.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 80.—Huene, Neues Jahrb. f. Min., Geol. and Pal., 1, 1899, p. 142.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 185.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 311.

**Crania acadiensis** Hall.

*Crania acadiensis* Hall, Canadian Nat. Geol., 5, 1860, p. 144, fig. 1.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 47; 3d ed., 1878, p. 595, fig. 198. Silurian: East River, Nova Scotia.

**Crania albersi** Miller and Faber.

*Crania albersi* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 154, pl. 8, figs. 17-19.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 760, fig. 1406. Eden (Economy): Cincinnati, Ohio, and vicinity.

**CRANIA ALTERNATA** James. See *Crania scabiosa*.

**Crania anna** Spencer.

*Crania anna* Spencer, Bull. Univ. Missouri, 1, 1884, p. 57; Trans. St. Louis Acad. Sci., 4, 1886, p. 607, pl. 8, fig. 4.

Niagaran dolomite: Hamilton, Ontario.

**CRANIA ASPERULA** James. See *Crania scabiosa*.

**CRANIA CORRUGATA** Lesley. See *Lichenalia concentrica*.

**CRANIA COSTATA** James. See *Crania scabiosa*.

**CRANIA? DEFORMATA** Miller. See *Archinacella deformata*.

**Crania dentata** Ringueberg.

*Crania dentata* Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 16, pl. 2, fig. 6.

Clinton (Rochester): Lockport, New York.



**Crania? dubia** Foerste.

*Crania? dubia* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 565, pl. 37A, figs. 17a, b.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 189.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

**Crania dyeri** Miller.

*Crania dyeri* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 13, fig. 3; N. A. Geol. Pal., 1889, p. 341, fig. 553.

Eden (Economy): Cincinnati, Ohio and vicinity.

**CRANIA EXCENTRICA** Miller. See *Orbicula excentrica*.

**CRANIA FILOSA** Hitchcock. See *Schizocrania filosa*.

**Crania gracilis** Ringueberg.

*Crania gracilis* Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 17, pl. 2, fig. 7.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 190.

*Crania pannosa* Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 17, pl. 2, fig. 8. Clinton (Rochester): Lockport, New York.

**Crania granulosa** N. H. Winchell.

*Crania granulosa* N. H. Winchell, 8th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1880, p. 63.—Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 343.—

Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 373, pl. 29, figs. 34, 35. Black River (Platteville): Minneapolis, Minnesota.

**Crania granulosa cumberlandensis** Foerste.

*Crania granulosa-cumberlandensis* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 41, pl. 5, fig. 8.

Black River (Lowville): Wells Creek Basin, near Cumberland, Tennessee; High Bridge, Kentucky.

**CRANIA HALLI** Sardeson. See *Petrocrania ulrichi*.

**Crania lælia** Hall.

*Crania lælia* Hall, Descriptions n. sp. Crinoidea and Other Fossils, 1866, p. 13; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 220, pl. 7, fig. 16.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 12.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 75, pl. 1, fig. 16.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 207, fig. 242.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 897, pl. 33, fig. 2.

Maysville and Richmond: Cincinnati, Ohio, and many localities in Ohio, Indiana, Kentucky, Tennessee, etc.

**CRANIA MINUTULA** Miller. See *Schizotreta minutula*.

**CRANIA MULTIPUNCTATA** Miller. See *Crania scabiosa*.

**CRANIA PANNOSEA** Ringueberg. See *Crania gracilis*.

**CRANIA PARALLELA** Ulrich. See *Crania scabiosa*.

**CRANIA PERCARINATA** Ulrich. See *Crania scabiosa*.

**CRANIA PRONA** Raymond. See *Petrocrania prona*.

**CRANIA RETICULARIS** Miller. See *Trematis reticularis*.

***Crania(?) reversa* Sardeson.**

*Crania(?) reversa* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 77, pl. 3, figs. 6, 7.

St. Peter sandstone: St. Paul, Minnesota.

***Crania scabiosa* Hall.**

*Crania scabiosa* Hall, Descriptions n. sp. Crinoidea and other Foss., 1866, p. 13.; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 220, pl. 7, fig. 15.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 74, pl. 1, fig. 17.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 12.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 148, pl. 4H, figs. 23–28, 30, 31.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 191.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 206, fig. 240.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 898, pl. 33, fig. 3–3a.

*Crania multipunctata* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 13, fig. 4.—N. A. Geol. Pal., 1887, p. 341, fig. 554.

*Crania percarinata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 98, pl. 4, fig. 12.

*Crania parallela* Ulrich, *ibid.*, 1878, p. 98, pl. 4, fig. 13.

*Crania asperula* James, Palaeontologist, 3, 1879, p. 22.

*Crania costata* James, *ibid.*, 1879, p. 22.

*Crania alternata* James, *ibid.*, 1879, p. 23.

*Philhedra scabiosa* Huene, Neues Jahrb. f. Min., Geol. and Pal., 1, 1898, p. 147 (gen. ref.).

Eden-Richmond: Cincinnati, etc., Ohio; Indiana; Kentucky; Tennessee; Wisconsin; etc.

***Crania setifera* Hall.**

*Crania setifera* Hall, Trans. Albany Inst., 4, 1863, p. 209 (not Hall, 1866); 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1876, pl. 21, figs. 8–10; Mus. ed., 1879, p. 148, pl. 21, figs. 8–10; 11th Rep. State Geol. Indiana, 1882, p. 283, pl. 21, figs. 8–10.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 18.—Crane, Geol. Mag., dec. 4, 2, 1895, pl. 5, fig. 20.

Niagaran (Waldron): Waldron, Indiana.

***Crania setigera* Hall.**

*Crania setigera* Hall, Descriptions n. sp. Crinoidea and other Fossils, 1866, p. 12; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 220, pl. 7, fig. 15.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, figs. 14–16.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 372, pl. 29, figs. 32, 33.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 207, fig. 241e–f.

Black River (Platteville and Decorah): Mineral Point and Beloit, Wisconsin; Decorah, Iowa; Minneapolis, Cannon Falls, etc., Minnesota.

***Crania siluriana* Hall.**

*Crania siluriana* Hall, Trans. Albany Inst., 4, 1863, p. 208; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 148, pl. 21, figs. 3–7; 11th Rep. State Geol. Indiana, 1882, p. 282, pl. 21, figs. 3–7.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 13, pl. 1, figs. 1, 2.

Niagaran (Waldron): Waldron, Indiana; Tennessee.

***Crania socialis* Ulrich.**

*Crania socialis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 98, pl. 4, fig. 14.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 29.

Eden: Cincinnati, Ohio and vicinity.



**Crania spinigera** Hall.

*Crania spinigera* Hall, Descriptions n. sp. Foss. Waldron, Indiana, 1879, p. 13; 11th Rep. State Geol. Indiana, 1882, p. 283, pl. 27, fig. 1; Trans. Albany Inst., 10, 1883, p. 69.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 17.

Niagaran (Waldron): Waldron, Indiana.

**Crania trentonensis** Hall.

*Crania trentonensis* Hall, Desc. n. sp. Crinoidea and other Fossils, 1866, p. 12; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 219, pl. 7, figs. 11, 12.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, figs. 21, 22.—Winchell and Schuchert, Geol. Minnesota, 1893, p. 374, pl. 29, figs. 36, 37.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 207, fig. 241c-d.

Trenton: Middleville, New York; Cannon Falls, Minnesota; Janesville, Wisconsin; Dixon, Illinois.

**CRANIELLA** Ehlert. See *Petrocrania* Raymond.

**CRANIOPS** Hall. See *Pholidops* Hall.

**Crateripora** Ulrich.

*Crateripora* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 29.

Observation.—The forms for which this genus was proposed have been found to be the basal articulating sockets of species of *Escharopora* and *Arthropora*.

**CRATERIPORA** **ERECTA** Ulrich. See *Arthropora shafferi*.

**CRATERIPORA** **LINEATA** Ulrich. See *Escharopora falciformis*.

**CRATERIPORA** **LINEATA** var. **EXPANSA** Ulrich. See *Escharopora falciformis*.

**CRATEROPHYLLUM** Foerste. See *Chonophyllum*, subgenus *Craterophyllum*.

**CREMACRINUS** Ulrich.

Genotype: *C. punctatus* Ulrich.

*Cremacrinus* Ulrich, Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 14, 1886, p. 107.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 201 (Rev. Pal., pt. 3, sec. 2, p. 277).—Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 396, 405.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 148.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 213.

*Castocrinus* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 392, pl. 11, fig. 1; Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 9; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 21, 58, 61, fig. 13a, 63.—Miller, N. A. Geol. Pal., 2d App., 1907, p. 740.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 148, fig. 61, 1.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 154.—Zittel, Grundzuge Pal., 1, 1910, p. 152.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1890, p. 387. (Genotype: *Calceocrinus furcillatus* Billings.)

**Cremacrinus articulatus** (Billings).

*Heterocrinus articulatus* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 51, pl. 4, fig. 8.

*Calceocrinus* (*Heterocrinus*) *articulatus* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1883, p. 212.

*Calceocrinus articulatus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 130 (Rev. Pal., pt. 3, sec. 2, p. 206).—Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 113.

**Cremaerinus articulatus**—Continued.

*Castocrinus articulatus* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 395, pl. 10, fig. 4.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 25 (loc. occ.).

*Calceocrinus kentuckiensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 29, pl. 2, fig. 24, 25.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1322.

*Castocrinus Kentuckiensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 30.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Mercer County, Kentucky.

**Cremaerinus barrandei** (Walcott).

*Calceocrinus Barrandei* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1883, p. 212, pl. 17, figs. 1, 2 (author's ed., p. 6).

*Cremaerinus barrandei* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

Trenton: Trenton Falls, New York.

**Cremaerinus billingsianus** (Ringueberg).

*Castocrinus billingsianus* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 394, pl. 10, fig. 3 (separate, p. 7).

Trenton (?Curdsville): Ottawa, Ontario.

**CREMACRINUS CHRYSALIS** Ulrich. See *Eucheirocrinus chrysalis*.**Cremaerinus furellatus** (Billings).

*Calceocrinus furcillatus* Billings, Ottawa Naturalist, 1, 1887, p. 51, pl., fig.

*Castocrinus furcillatus* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 393, pl. 10, fig. 1.

Trenton (?Curdsville): Ottawa, Ontario.

**Cremaerinus inæqualis** (Billings).

*Heterocrinus inæqualis* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 51, pl. 4, fig. 7a.

*Calceocrinus inæqualis* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 130, 205 (Rev. Pal., pt. 3, sec. 2, pp. 206, 281).

*Cremaerinus inæqualis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

*Castocrinus inæqualis* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 395, pl. 10, fig. 5.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 25 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**Cremaerinus punctatus** Ulrich.

*Cremaerinus punctatus* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 107, fig. 1.

Black River (Decorah): Minneapolis, Minnesota.

**CREMACRINUS RADICULUS** Ulrich. See *Eucheirocrinus radiculatus*.**Cremaerinus rugosus** (Billings).

*Calceocrinus rugosus* Billings, Ottawa Naturalist, 1, 1887, p. 53, pl., figs.—Miller, N. A. Geol. Pal., 1889, p. 230, fig. 259.

*Castocrinus rugosus* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 393, pl. 10, fig. 2.

Trenton (Curdsville): Belleville, Ontario.

**CREPICEPHALUS (LOGANELLUS) CENTRALIS** Whitfield. See *Ptychoparia oweni*.



**CREPICEPHALUS (LOGANELLUS) GRANULOSUS** Hall and Whitfield. See *Ptychoparia granulosa*.

**CREPICEPHALUS (LOGANELLUS) HAGUEI** Hall and Whitfield. See *Ptychoparia haguei*.

**CREPICEPHALUS (LOGANELLUS) MACULOSUS** Hall and Whitfield. See *Ptychoparia maculosa*.

**CREPICEPHALUS (LOGANELLUS) UNISULCATUS** Hall and Whitfield. See *Ptychoparia unisulcata*.

**CREPIPORA** Ulrich.

Genotype: *C. simulans* Ulrich.

*Crepipora* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 157.—Miller, N. A. Geol. Pal., 1889, p. 299.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 469; Geol. Minnesota, 3, 1893, p. 322.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 15.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122.—Hennig, Archiv. fur Zool., 4, No. 21, 1908, p. 9.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 85, 86; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 328.

**CREPIPORA EPIDERMATA** Ulrich. See *Favositella epidermata*.

**Crepipora hemispherica** Ulrich.

*Crepipora hemispherica* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 472, pl. 40, figs. 5-5b.

Richmond: Wilmington, Illinois (Fernvale); Delafield, Wisconsin (Maquoketa).  
*Cotype*.—Cat. No. 43234, U.S.N.M.

**CREPIPORA IMPOLITA** Ulrich. See *Anolotichia impolita*.

**Crepipora impressa** Ulrich.

*Crepipora impressa* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 471, pl. 40, figs. 2, 2a.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566, figs. 135, 136.

Maysville (Fairmount): Covington, Kentucky.

*Holotype*.—Cat. No. 43231, U.S.N.M.

**Crepipora perampla** Ulrich.

*Crepipora perampla* Ulrich, Geol. Minnesota, 3, 1893, p. 323, pl. 28, figs. 29-32; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267, figs. 436A-C.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, figs. 464a-c.

Black River (Platteville): Chatfield and near Spring Valley, Minnesota.

Part of *holotype*.—Cat. No. 43235, U.S.N.M.

**Crepipora simulans** Ulrich.

*Crepipora simulans* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 470, pl. 39, figs. 4, 4a, pl. 40, figs. 3, 3a; p. 320, fig. 8b.—(Ulrich in press) Miller, N. A. Geol. Pal., 1889, p. 299, fig. 468.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 436D (p. 267).—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566, figs. 133, 134.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 217.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122, fig. 178k.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 464d.

Maysville (Fairmount): Cincinnati, Ohio; Indiana; Kentucky; Tennessee.

*Cotypes*.—Cat. No. 43230, U.S.N.M.

**Crepipora? solida** Ulrich.

*Crepipora solida* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 472, pl. 40, figs. 4-4b.

Eden (Economy): Covington, Kentucky

*Cotypes*.—Cat. No. 43232, U.S.N.M.

**Crepipora spatiosa** Ulrich.

*Crepipora spatiosa* Ulrich, Geol. Minnesota, 3, 1893, p. 323.

Trenton (Cynthiana): Harrodsburg and Frankfort, Kentucky.

*Holotype*.—Cat. No. 43228, U.S.N.M.

**Crepipora subæquata** Ulrich.

*Crepipora subæquata* Ulrich, Geol. Minnesota, 3, 1893, p. 322, pl. 28, figs. 26-28.

Black River (Decorah): St. Paul, Minnesota.

*Holotype*.—Cat. No. 43233, U.S.N.M.

**Crepipora venusta** (Ulrich).

*Chaetetes venustus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 93, pl. 4, figs. 7, 7a.

*Crepipora venusta* Ulrich, *ibid.*, 5, 1882, p. 257.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 49, pl. 2, fig. 7.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 126.

*Monticulipora* (*Fistulipora*) *venusta* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 33.

Trenton (Upper) and Eden (Economy): Covington, etc., Kentucky; Ohio; Indiana.

*Holotype*.—Cat. No. 43236, U.S.N.M.

**CRESEIS CORRUGATA** Matthew. See *Styliola corrugata*.

**CRESEIS MINUTA** Matthew. See *Styliola minuta*.

**CRINOCYSTIS** Bather. See *Crinocystites* Hall.

**CRINOCYSTITES** Hall.

Genotype: *C. chrysalis* Hall.

*Crinocystites* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 317, extras, 1864; rev. ed., 1870, p. 361.—Miller, N. A. Geol. Pal., 1889, p. 234.

*Crinocystis* Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 77.

**Crinocystites chrysalis** Hall.

*Crinocystites chrysalis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 318, pl. 12a (1), figs. 10, 11; extras, 1864; rev. ed., 1870, p. 362, pl. 12a, figs. 10, 11.

*Crinocystis chrysalis* Haeckel, Amphorideen u. Cystoideen, 1896, p. 69.

Niagaran (Racine): Racine, Wisconsin.

**Crinocystites(?) rectus** (Hall).

*Crinocystites? rectus* Hall, 20th Rep. New York State Nat. Hist., 1868, p. 318 (extras, 1864).

*Rhodocrinus(?) rectus* Hall, *ibid.*, 1868, p. 379, pl. 10 (1), fig. 2; rev. ed., 1870, p. 368, pl. 11, fig. 10 (pl. 10, fig. 2).

Niagaran (Racine): Racine, Wisconsin.

**CRINOSOMA ANTIQUA** Castelnau. See *Arthropycus alleghaniensis*.

**CRISINELLA CEILENSIS** Wiman. See *Protocrisina exigua*.

**CROMUS** Barrande. See *Encrinurus Emmrich*.

**CROMUS ARCTICUS** Haughton. See *Encrinurus lævis*.



*CROTALOCRINITES* Austin and Austin. See *Crotalocrinus* Austin and Austin.

**CROTALOCRINUS** Austin and Austin. Genotype: *Cyathocrinites rugosus* Miller.

*Crotalocrinites* Austin and Austin, Ann. Mag. Nat. Hist., 11, 1843, p. 198.

*Crotalocrinus* Morris, Cat. British Foss., 1st ed., 1848, p. 50.—Muller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 254.—McCoy, British Pal. Rocks and Foss., 1854, p. 54.—Salter, in Murchison, Siluria, 2d ed., 1854, p. 219.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 312.—Austin, Cat. Camb. Sil. Foss., 1873, p. 123.—Angelin, Icon. Crinoid., 1878, p. 26.—Zittel, Handb. Pal., 1, 1879, p. 356.—DeLoriol, Pal. Francaise, 2, 1882, p. 51.—Carpenter, Ann. Mag. Nat. Hist., 5th ser., 18, 1886, p. 397.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 66, 69, (Rev. Pal., pt. 3, sec. 2, pp. 142, 145); 1888, pp. 264–390.—Jaekel, Zeits. d. d. geol. Gesell., 49, 1897, p. 47.—Weller, Jour. Geol., 6, 1898, p. 700.—Bather, Geol. Mag., dec. 4, 5, 1898, p. 327, figs. 1, 3, 4; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 176, fig. 92, 3.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, pp. 19, 141, fig. 52.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 216.

*CROTALOCRINUS AMERICANUS* Weller. See *Crotalocrinus cora*.

**Crotalocrinus cora** (Hall).

*Cyathocrinus cora* Hall, adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1865, p. 20, pl. (2), figs. 13, 14; doc. ed., 1867; 20th Rep., 1868, p. 324, pl. 11 (2), figs. 13, 14; rev. ed., 1870, p. 366, pl. 11, figs. 13, 14.—Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 174.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 62, pl. 14, figs. 6–10.

*Crotalocrinus americanus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 143, pl. 14, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 561.

*Crotalocrinus cora* Weller, Jour. Geol., 10, 1902, pp. 532, 534, pl. 3, figs. 1–5.—Slocum, Field Columbian Mus., 2, Geol. Ser., No. 10, 1908, p. 292, pl. 86, figs. 3, 4.

Niagaran (Racine): Racine, Wisconsin; Chicago, etc., Illinois.

**Crotalocrinus? vanhornel** (Miller).

*Cyathocrinus vanhornei* Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 261, pl. 6, fig. 3.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 64, pl. 14, fig. 5.

*Crotalocrinus? vanhornei* Weller, Jour. Geology, 10, 1902, p. 533 (gen. ref.).

Niagaran (Racine): Bridgeport, Illinois.

*CRUMENÆCRINITES* Troost. See *Periechocrinus* Austin.

*CRUMENÆCRINITES OVALIS* Troost. See *Periechocrinus tennesseensis*.

**CRUZIANA** D'Orbigny.

Genotype: *C. rugosa* D'Orbigny.

*Cruziana* D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1842, p. 30.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 559.—Salter, Proc. Geol. Soc. London, 1860, p. 70; Mem. Geol. Surv. Great Britain, 3, 1866, p. 291; 2d ed., 1881, p. 482.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, pp. 33, 87.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, pp. 153–157.—Lebesconte, Bull. Soc. Geol. France, 3d ser., 14, 1886, p. 810.—Bornemann, Nova Acta K. Leop. Carol. Deutsch. Akad. der Natur., 51, No. 1, 1886, p. 11.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 21, No. 14, 1886, p. 16.—Walcott, Proc. U. S. Nat. Mus., 12, 1890, p. 35.—Miller, N. A. Geol. Pal., 1889, p. 115.

Observation.—Possibly the same as *Rusophycus*.

**CRUZIANA ASPERA** James. See *Rusophycus asper*.

**CRUZIANA BILOBATA** Hall. See *Rusophycus bilobatus*.

**CRUZIANA CARLEYI** James. See *Rusophycus carleyi*.

**Cruziana cucurbita** Salter.

*Cruziana cucurbita* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, figs. 4-6.

Ordovician?: Valleys of Unduavi and Aceromarka, Bolivia.

**Cruziana furcifera** D'Orbigny.

*Cruziana furcifera* D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1847, p. 31, 8, Atlas, pl. 1, figs. 2, 3.

*Cruziana furcifera* Ulrich, Neues Jahrb. f. Min., Geol. Pal., 8, Beilage-Band, 1893, p. 86.

Ordovician: Cochabamba, Bolivia.

**CRUZIANA PUDICA** James. See *Rusophycus pudicum*.

**Cruziana rugosa** D'Orbigny.

*Cruziana rugosa* D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1842, p. 30, 8, Atlas, pl. 1, fig. 1.

Silurian: Cochabamba, Bolivia.

**CRUZIANA SUBANGULATA** James. See *Rusophycus subangulatus*.

**Cruziana unduavi** Salter.

*Cruziana unduavi* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, figs. 7, 8.

Ordovician?: Valleys of Aceromarka and Unduavi, Bolivia.

**CRYPTOCERAS UNDATUM** Chapman. See *Plectoceras halli*.

**CRYPTODISCUS** Hall. See *Callicrinus* D'Orbigny.

**CRYPTOGRAPTUS** Lapworth. Genotype: *Diplograptus tricornis* Carruthers.

*Cryptograptus* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 174.—Ruedemann, Mem. New York State Mus., 11, pt. 2, pp. 442, 443.

**Cryptograptus? antennarius** (Hall).

*Climacograptus antennarius* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 112, pl. 13, figs. 11-13.—Roemer and Frech, Lethaea Pal., 1, 1897, p. 611.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 731-732, pl. 16, figs. 21-26.

*Climacograptus antennarius* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 6, 1870, p. 382, fig. 6; Mon. Brit. Grapt., 1872, p. 49, fig. 16.

*Diplograptus antennarius* Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 139.

*Cryptograptus? antennarius* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 174.—Gurley, Jour. Geol., 4, 1896, p. 299 (gen. ref.).—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 519, fig. 31, p. 520.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 443.

*Diplograptus laxis* Ruedemann, Ann. Rep. New York State Pal., 1902, p. 571; Mem. New York State Mus., 7, pt. 1, 1904, pp. 722, 723, pl. 16, figs. 1-10.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Deepkill and Mount Moreno, New York (Deepkill, *D. dentatus* zone); Arkansas; Great Britain.

**CRYPTOGRAPTUS MARCIDUS** Dodge. See *Cryptograptus tricornis*.



**Cryptograptus tricornis** (Carruthers).

*Diplograptus tricornis* Carruthers, Trans. Royal Phys. Soc. Edinburgh, 1, 1858, p. 468, fig. 2; Ann. Mag. Nat. Hist., 3, 1859, p. 25, fig. 2; Geol. Mag., 5, 1868, p. 131, fig. 11.—Hopkinson and Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 658, fig. 6.—Lapworth, Cat. West Scott. Foss., 1876, fig. 30; Rep. and Proc. Belfast Nat. Field Club, 2d ser., 1, pt. 4, app., 1877, p. 132, pl. 6, fig. 10.—Ami, Rep. Geol. Surv. Canada, 2d ser., 3, pt. 2, 1889, pp. 50K, 117K.

*Cryptograptus tricornis* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 171, pl. 5, figs. 27a–27e; Proc. and Trans. Royal Soc. Canada, 4, 1887, p. 177; Science, 9, 1887, p. 320; Canadian Rec. Sci., 3, 1888, p. 141; Rep. Geol. Surv. Canada, 2d ser., 3, pt. 1, 1889, p. 95B.—Gurley, Jour. Geol., 4, 1896, p. 298.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 527.—Hall, Proc. Royal Soc. Victoria, 18, pt. 1, 1905, p. 21.—Ami, Geol. Surv. Canada, Sum. Rep. for 1904, 1905, p. 12.—Hall, Rec. Geol. Surv. Victoria, 1, pt. 4, 1906, p. 275.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 443–448, pl. 28, figs. 1–4; figs. 410–417.

*Cryptograptus (Idiograptus) tricornis*, Perner, Etudes sur les Grapt. Boheme, pt. 2, 1895, p. 26, pl. 7, figs. 7–10.

*Diplograptus etheridgii* Hopkinson, Geol. Mag., 9, 1872, p. 504, fig. 5.

*Graptolithus marcidus* Hall, Pal. New York, 3, 1859, p. 515, figs. 1–3; 13th Ann. Rep. New York State Cab. Nat. Hist., 1860, pp. 58, 59, figs. 1–3.

*Diplograptus marcidus* Walcott, Trans. Albany Inst., 10, 1883 (adv. sheet 1879, p. 34).—Whitfield, Amer. Jour. Sci., 3d ser., 26, 1883, p. 380.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.

*Cryptograptus marcidus* Dodge, Amer. Jour. Sci., 3d ser., 40, 1890, p. 153.

Middle Ordovician: South Scotland (Glenkiln and Hartfell); New York slate belt (Normanskill); Canada; Tennessee; Arkansas; Australia; Bohemia; etc.

**Cryptograptus tricornis insectiformis** Ruedemann.

*Cryptograptus tricornis* mut. *insectiformis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 448, 449, pl. 28, figs. 5, 419–422.

Trenton (Snake Hill): Van Schaick Island, Cohoes, New York

**CRYPTOLITHUS** Green.

Genotype: *C. tessellatus* Green.

*Cryptolithus* Green, Mon. Tril. N. Amer., 1832, p. 72.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 540–542.—Emmrich, *ibid.*, 1845, p. 44.—Hall, Pal. New York, 1, 1847, p. 235, footnote.

*Nuttainia* Eaton, Geol. Textb., 2d ed., 1832, p. 33.—Green, Mon. Tril. N. Amer., 1832, p. 88.—Hall, Pal. New York, 1, 1847, p. 235, footnote.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, p. 62.

*Trinucleus* Murchison, Sil. Syst., 1839, p. 659.—Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 115.—Salter, Quart. Jour. Geol. Soc. London, 3, 1847, p. 251.—Hawle and Corda, Abh. d. k. bohm. Gesell. Wiss., 5 (extract), 1847, p. 38, pl. 3, fig. 17.—Salter, Mem. Geol. Surv. United Kingdom, dec. 7, 1853, pl. 7.—McCoy, Brit. Pal. Rocks and Foss., 1854, p. 144.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 508.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 212.—Chapman, Canadian Jour., n. s., 1, 1856, p. 273; 8, 1863, p. 28; Expos. Min. Geol. Canada, 1864, p. 136.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 126.—Zittel, Handb. Pal., 2, 1885, p. 593.—Miller, N. A. Geol. Pal., 1889, p. 568.—Beecher, Amer. Jour. Sci., 3d ser., 46, 1893, p. 143.—Vogdes, Cal. Acad. Sci., Occ. Pap., 4, 1893, p. 359.—Beecher, Amer. Jour. Sci., 3d ser., 49, 1895, p. 307; Amer. Geol., 16, 1895, pp. 167, 176.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15, fig. 9, 1.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 105, 184, 186, pl. 3, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 258.

**Cryptolithus bellulus** (Ulrich).

*Trinucleus bellulus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 99, pl. 4, fig. 15.

Eden: Covington, Kentucky, and vicinity (Economy); New York (Indian Ladder).

*Holotype*.—Cat. No. 41876, U.S.N.M.

**Cryptolithus bigsbii** Green.

Not recognized.

*Cryptolithus Bigsbii* Green, Mon. Tril. N. Amer. 1832, p. 76.

Ordovician: Montmorency, near Quebec, Ontario.

**Cryptolithus boliviensis** (Lake).

*Trinucleus boliviensis* Lake, Quart. Jour. Geol. Soc. London, 62, 1906, p. 427, pl. 40, figs. 4, 5.

Ordovician: Near Apolo, Bolivia.

**Cryptolithus kruegeri** (Hoek).

*Trinucleus kruegeri* Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 236, pl. 10, figs. 7, 8.

Ordovician: Cochabamba, Bolivia.

**Cryptolithus tessellatus** Green.

*Cryptolithus tessellatus* Green, Mon. Tril. North Amer., 1832, p. 73, cast 38, pl. 1, fig. 4; Monthly Amer. Jour. Sci., 1, 1832, pl. 1, fig. 4.—Conrad, Amer. Jour. Sci., 38, 1840, p. 91, footnote.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 48.—Locke, Proc. Acad. Nat. Sci. Philadelphia, 1, 1842, pp. 196, 236, fig.—Rouault, Bull. Soc. Geol. France, 2d ser., 6, 1849, p. 83.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 78 (gives history of genus and species); 17, 1914, p. 317.

*Trinucleus tessellatus* Emmons, Nat. Hist. New York, Geol., 2, 1842, pp. 115, 390, 391, fig. 7.—Owen, Amer. Jour. Sci., 47, 1844, pp. 363, 364, fig. 7.

*Nuttainia concentrica* Eaton, Geol. Textb., 2d ed., 1832, p. 34, pl. 1, fig. 2.—Green, Mon. Tril. North Amer., 1832, p. 76.

*Trinucleus caractaci* Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 403, fig. 1.—Owen, Amer. Jour. Sci., 47, 1844, p. 377, 378.—De Verneuil, *ibid.*, 2d ser., 7, 1849, p. 223.—Emmons, Man. Geol., 1860, p. 103, fig. 93.

*Trinucleus concentricus* Hall, Pal. New York, 1, 1847, p. 249, pl. 65, figs. 4a, c; p. 255, pl. 67, figs. 1a-h.—Salter, Mem. Geol. Surv. United Kingdom, dec. 7, 1853, p. 51, pl. 7.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 212, pl. 15, fig. 4a, b; pl. 16, fig. 7; pl. 17, fig. 1.—Chapman, Canadian Jour., n. s., 1, 1856, p. 273; 3, 1858, p. 514, fig.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 820, fig. 611.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 47, pl. 3, fig. 5; pl. 4, fig. 12.—Hitchcock, Geol. Vermont, 1, 1861, p. 300, fig. 215.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 190, fig. 191a, b.—Chapman, Canadian Jour., n. s., 8, 1863, p. 28, fig. 139; p. 200, fig. 195; Expos. Min. Geol. Canada, 1864, p. 136, fig. 139; p. 172, fig. 195.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 320, pl. 19, fig. 4; Cat. Camb. Sil. Foss., 1873, p. 49.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 126.—Walcott, Bull. Mus. Comp. Zool., 8, 1881, p. 199.—Salter, Mem. Geol. Surv. Great Britain, 3, 2d ed., 1881, p. 517, pl. 19, fig. 4.—Miller, N. A. Geol. Pal., 1889, p. 569, fig. 1063.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1223, fig.—Beecher, Amer. Jour. Sci., 3d ser., 49, 1895, p. 309, pl. 3, figs. 1-6.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 192, pl. 14, figs. 3, 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1064, pl. 44, fig. 11.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 7, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259, fig. 1547.



**Cryptolithus tessellatus**—Continued.

Trenton-Maysville: Glens Falls, near Waterford, etc., New York; Canada; Pennsylvania; New Jersey; Ohio; Kentucky; Oklahoma; Virginia; etc.

*Plastotype*.—Cat. No. 4921, U.S.N.M.

**CRYPTONYMUS** Eichwald. See *Asaphus Brongniart* and *Encrinurus Emmrich*.

**CRYPTOPHRAGMUS** Raymond.

Genotype: *C. antiquatus* Raymond.

*Cryptophragmus* Raymond, Bull. Victoria Mem. Mus., 5, 1914, p. 8.

**Cryptophragmus antiquatus** Raymond.

*Cryptophragmus antiquatus* Raymond, Bull. Victoria Mem. Mus., 5, 1914, p. 8, pls. 1-4.

Black River (Lowville): Carden, etc., Ontario; Quebec; New York.

**CRYPTOPORA** Nicholson. See *Semicoscium* Prout.

**CRYPTOZOON** Hall.

Genotype: *C. proliferum* Hall.

*Cryptozoon* Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, expl. of pl. 6.—

Miller, N. A. Geol. Pal., 1889, p. 157.—Dawson, Canadian Rec. Sci., 7, 1896, p. 204.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 46.—Seely, Rep. State Geol. Vermont, 5, 1906, p. 160.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 257.—Wieland, Bull. Amer. Mus. Nat. Hist., 33, 1914, p. 239.

**Cryptozoon bassleri** Wieland.

*Cryptozoon bassleri* Wieland, Bull. Amer. Mus. Nat. Hist., 33, 1914, p. 239, figs. 1, 2, pls. 14-18.

Upper Cambrian or Ozarkian: Near Pennsylvania State College, Center County, Pennsylvania.

**Cryptozoon boreale** Dawson.

*Cryptozoon boreale* Dawson, Canadian Rec. Sci., 7, 1896, p. 207, fig. 1.

Trenton: Lake St. John, Quebec.

**Cryptozoon giganteum** Chaney.

*Cryptozoon giganteum* Chaney, Bull. Minnesota Acad. Nat. Sci., 3, 1891, p. 283.

Canadian (Shakopee): Northfield, Minnesota.

**Cryptozoon lachutense** Dawson.

*Cryptozoon lachutense* Dawson, Canadian Rec. Sci., 7, 1896, p. 206.—Seely, Rep. State Geol. Vermont, 5, 1906, p. 168.

Canadian (Beekmantown): Lachute, Quebec.

**Cryptozoon minnesotense** Winchell.

*Cryptozoon minnesotense* Winchell, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 313, pl. 1, figs. 1, 2; pl. 2, fig. 3.—Chaney, Bull. Minnesota Acad. Nat. Sci., 3, 1891, p. 280.—Dawson, Canadian Rec. Sci., 7, 1896, p. 206.

Canadian (Shakopee): Cannon Falls, Northfield, and Mankato, Minnesota.

**Cryptozoon minnesotense libertatis** Winchell.

*Cryptozoon minnesotense* var. *libertatis* Winchell, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 315, pl. 2, fig. 4.

Canadian (Shakopee): Northfield, Minnesota.

**Cryptozoon perkinsi** Seely.

*Cryptozoon?* *perkinsi* Seely, Rep. State Geol. Vermont, 4, 1904, p. 150.

Chazy: Isle la Motte, Vermont.

**Cryptozoon proliferum** Hall.

*Cryptozoon proliferum* Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, pl. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 163, fig.—Dawson, Canadian Rec. Sci., 7, 1896, p. 204, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 46.—Seely, Rep. State Geol. Vermont, 5, 1906, p. 161.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, p. 155, pl. 18, fig. 2.—Wieland, Bull. Amer. Mus. Nat. Hist., 33, 1914, p. 244, fig. 2.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 258, pl. 37, figs. 1-3.

Upper Cambrian or Ozarkian: Saratoga and Herkimer Counties, New York (Hoyt); Pennsylvania; Maryland; Virginia (Conococheague).

*Plesiotype*.—Cat. Nos. 56629, 58541, 58543, U.S.N.M.

**Cryptozoon saxiroseum** Seely.

*Cryptozoon saxiroseum* Seely, Rep. State Geol. Vermont, 5, 1906, p. 162, pls. 36, 37, figs. 3-6.—Perkins, Rep. State Geol. Vermont, 8, 1912, pl. 16.

Canadian (Beekmantown): Beekmantown, New York.

**Cryptozoon steeli** Seely.

*Cryptozoon steeli* Seely, Rep. State Geol. Vermont, 5, 1906, p. 161, pls. 34, 36, 43, fig. 1.

Canadian (Beekmantown): Clinton County, New York; Pennsylvania; Maryland.

**Cryptozoon wingi** Seely.

*Cryptozoon wingi* Seely, Rep. State Geol. Vermont, 5, 1906, p. 163, pl. 38.

Canadian (Beekmantown): Mount Independence, Orwell County, Vermont.

**CRYSTALLOCYSTIS AURANTIUM** Haeckel. See *Echinosphærites aurantium*.

**CTENOBOLBINA** Ulrich.

Genotype: *Beyrichia ciliata* Emmons.

*Ctenobolbina* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 108.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 706.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 673.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 309.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 19, 1900, p. 180.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 309.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1040.—Bonnema, Mitt. Min. Geol. Inst. Groningen, 2, 1909, p. 43.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 353.

**Ctenobolbina alata** Ulrich.

*Ctenobolbina alata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 110, pl. 7, figs. 4a-c.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 6, pl. 40, figs. 6-8.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 41489, U.S.N.M.

**Ctenobolbina bispinosa** Ulrich.

*Ctenobolbina bispinosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 110, pl. 7, fig. 6.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, fig. 9.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 41490, U.S.N.M.

**Ctenobolbina ciliata** (Emmons).

*Beyrichia ciliata* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 219, fig. 74c.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 351.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 89, fig.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 19, pl. 3, figs. 12-16; pl. 4, figs. 16-18.



**Ctenobolbina ciliata**—Continued.

*Ctenobolbina ciliata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 108, pl. 7, figs. 1a, b.—Ruedemann, Bull. New York State Mus., 42, Pal., 8, 1901, p. 575, pl. 2, figs. 8, 9.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 7, pl. 40, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 353, fig. 1660, t, t'.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425e.

*Beyrichia tumifrons* Hall, Desc. n. sp. Fossils, Cincinnati, Ohio, 1871, p. 7, pl. 4, fig. 11; 24th Rep. New York State Mus. Nat. Hist., 1872, p. 231, pl. 8, fig. 11.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 119.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 102, pl. 4, fig. 8.

Eden: Cincinnati, Ohio, and vicinity.

Trenton (Snake Hill): Green Island, Albany County, New York.

*Plesiotypes*.—Cat. No. 41492, U.S.N.M.

**Ctenobolbina ciliata cornuta** Ruedemann.

*Ctenobolbina ciliata cornuta* Ruedemann, Bull. New York State Mus., 42, Pal., 1901, p. 575, pl. 2, figs. 5-7.

Trenton (Snake Hill): Mechanicsville, Saratoga County, and Green Island, Albany County, New York.

*CTENOBOLBINA CILIATA* var. *CURTA* Ulrich. See *Ctenobolbina curta*.

*CTENOBOLBINA CILIATA* var. *EMACIATA* Ulrich. See *Ctenobolbina emaciata*.

*CTENOBOLBINA CILIATA* var. *HAMMELLI* Cumings. See *Ctenobolbina hammelli*.

**Ctenobolbina crassa** (Ulrich).

*Jonesella crassa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 123, pl. 7, figs. 11a-c.

*Ctenobolbina crassa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 675, pl. 44, figs. 12-16.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, figs. 15, 16.

Black River (Decorah): Minneapolis, Cannon Falls, etc., Minnesota.

*Cotypes*.—Cat. No. 41497, U.S.N.M.

**Ctenobolbina curta** (Ulrich).

*Ctenobolbina ciliata* var. *curta* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 109, pl. 7, fig. 2.

*Ctenobolbina curta* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 310.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

**Ctenobolbina denticula** Ulrich and Bassler.

*Ctenobolbina?* *denticula* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 524, pl. 96, figs. 6-9.

Helderbergian (Keyser): Cumberland, Maryland.

*Holotype*.—Cat. No. 43307, U.S.N.M.

**Ctenobolbina?** *dubia* Ulrich and Bassler.

*Ctenobolbina?* *dubia* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 525, pl. 96, figs. 10-12.

Helderbergian (Keyser): Cumberland, Maryland.

*Holotype*.—Cat. No. 53277, U.S.N.M.

**Ctenobolbina duryi** (Miller).

*Beyrichia duryi* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 232, figs. 24, 25.—Miller, N. A. Geol. Pal., 1889, p. 534, figs. 976, 977.

*Ctenobolbina duryi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 108.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

**Ctenobolbina emaciata** (Ulrich).

*Ctenobolbina ciliata* var. *emaciata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 109, pl. 7, figs. 3a-c.

*Ctenobolbina emaciata* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 310, pl. 40, figs. 3-5.

Richmond (Maquoketa): Savannah, Illinois.

*Holotype*.—Cat. No. 41325, U.S.N.M.

**Ctenobolbina fulcrata** Ulrich.

*Ctenobolbina fulcrata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 674, pl. 44, figs. 8-11.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 297, fig. 40, pl. 40, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 353, fig. 1660, r, r', s.

Black River (Decorah): St. Paul, Minnesota.

*Cotypes*.—Cat. No. 41322, U.S.N.M.

**Ctenobolbina hammelli** (Miller and Faber).

*Beyrichia hammelli* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 156, pl. 8, fig. 26.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 787, fig. 1458.

*Ctenobolbina hammelli* Ulrich and Bassler, Proc. U. S. Nat. Mus. 35, 1908, p. 310.

*Ctenobolbina ciliata* var. *hammelli* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1045, pl. 53, fig. 6.

Richmond (Arnheim-Waynesville): Versailles, etc., Indiana; Lebanon, etc., Ohio.

**Ctenobolbina obliqua** Ulrich.

*Ctenobolbina obliqua* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 19, 1900, p. 180, pl. 8, fig. 4.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, fig. 10.

Trenton (Prosser): Kenyon, Minnesota.

*Holotype*.—Cat. No. 41328, U.S.N.M.

**Ctenobolbina punctata** Ulrich.

*Ctenobolbina punctata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 186, pl. 12, figs. 5a-c.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, figs. 19, 20.

Clinton (Rochester): Lockport, etc., New York; Grimsby, Ontario.

*Holotype*.—Cat. No. 41578, U.S.N.M.

**Ctenobolbina subcrassa** Ulrich.

*Ctenobolbina subcrassa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 19, 1900, p. 180, pl. 8, figs. 1-3.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 293, fig. 27; p. 297, fig. 42, pl. 40, figs. 17, 18.

Stones River (Ridley): High Bridge, Kentucky.

*Cotype*.—Cat. No. 41316, U.S.N.M.

**Ctenobolbina subrotunda** Ruedemann.

*Ctenobolbina subrotunda* Ruedemann, Bull. New York State Mus., 42, Pal., 1901, p. 576, pl. 2, figs. 1-4.

Trenton (Snake Hill): Port Schuyler, New York.

**Ctenobolbina tumida** Ulrich. See *Beyrichia tumida*.

**Ctenocrinus levis** Roemer. See *Melocrinus roemeri*.

**Ctenocrinus ornatus** Hall. See *Macrostylocrinus ornatus*.

**Ctenocrinus striatus** Hall. See *Macrostylocrinus striatus*.



**Ctenodonta** Salter.Genotype: *Tellinomya nasuta* Hall.

*Nucula* Hall (not Lamarck), Geol. Rep. 4th Dist. New York, 1842, p. 76. Amer. Jour. Sci., 48, 1843, p. 292; Pal. New York, 1, 1847, pp. 150, 316.

*Lyrodesma* Hall (part), Pal. New York, 1, 1847, p. 302.

*Ctenodonta* Salter, Rep. British Assoc. Adv. Sci., 1851, p. 63; Rep. 21st Meeting, British Assoc. Adv. Sci., Notes and Abstracts, 1852, p. 64; Geol. Surv. Canada, dec. 1, 1859, p. 34.—Winchell, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 128–129.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 308.—Zittel, Handb. d. Pal., 2, 1881, p. 51.—Lesley, Proc. Geol. Assoc. London, 10, 1888, p. 395.—Barrois, Ann. Soc. Geol. Nord, 19, Lille, 1891, p. 184.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 679; Geol. Minnesota, 3, pt. 2, 1894, p. 578.—Whidborne, Mon. Dev. Fauna South England, 3, Pal. Soc., 1896, p. 98.—Koken, Die Leitfossilien, Leipzig, 1896, p. 194.—Hind, Mon. British Carb. Lamellibranchiata, 1, Pal. Soc., 1897, pp. 177, 209.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 363.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 979.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 393.—Dall, Zittel-Eastmann Textb. Pal., 2d ed., 1913, p. 440.

*Tellinomya* Hall, Pal. New York, 1, 1847, p. 151.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 534.—Hall, Canadian Nat. Geol., 1, 1856, p. 391; 10th Rep. New York State Cab. Nat. Hist., 1857, pp. 181, 182, (extr., pp. 141, 142); Amer. Jour. Sci. and Arts, 2d ser., 25, 1858, p. 108; Pal. New York, 3, 1859, p. 14, footnote; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 76.—Hitchcock, Geol. Vermont, 1, 1861, p. 295.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 228, 229.—Salter, Mem. Geol. Surv. Great Britain, 2d ed., 1881, p. 550.—Koninck, Ann. d. Mus., Royal d'Hist. Nat. de Belgique, 11, 1885, p. 138.—Miller, N. A. Geol. Pal., 1889, p. 514.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, pp. 148–150.—Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 73.—Hind, Mon. British Carb. Lamellibranchiata, 1, Pal. Soc., 1897, p. 177 (Genotype: *T. nasuta* Hall).

Not *Tellinomya*, the correct form of *Tellimya* Brown, 1827, as given by Agassiz in his "Nomenclator Zoologicus" in 1846.

*Palaeoconcha* Miller, N. A. Geol. Pal., 1889, p. 498 (Genotype: *P. faberi* Miller).

**Ctenodonta abrupta** Billings.

*Ctenodonta abrupta* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 46, figs. 48a–c (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 143, figs. 79a–c; p. 175, figs. 161a–b.

*Tellinomya abrupta* Miller, N. A. Geol. Pal., 1889, p. 514 (gen. ref.).

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

**Ctenodonta? absimilis** (Sardeson).

*Tellinomya absimilis* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 74, pl. 3, figs. 1, 2.

St. Peter: Highland Park, Minnesota.

**Ctenodonta albertina** Ulrich.

*Ctenodonta albertina* Ulrich, Geol. Minnesota, 3, 1894, p. 598, pl. 42, figs. 76–82.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502m.

Richmond (Waynesville): Clarksville, etc., Ohio,

*Cotypes*.—Cat. No. 46122, U.S.N.M

**Ctenodonta alta** (Hall),

*Tellinomya alta* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 27.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 309, pl. 2, figs. 6a, b.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 50, pl. 6, figs. 5–8.

**Ctenodonta alta**—Continued.

- Ctenodonta alta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 602, pl. 42, figs. 93, 94.—  
Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502k-l.  
Trenton: Mount Carrol, Illinois; Dodgeville, Wisconsin (Galena); Fountain, Minnesota (Prosser).  
*Plesiotype*.—Cat. No. 46123, U.S.N.M.

**Ctenodonta angela** Billings.

- Ctenodonta Angela* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 221, fig. 203.  
Tellinomya Angela Miller, N. A. Geol. Pal., 1889, p. 514 (gen. ref.).  
Chazy (Quebec—M): Table Head, Newfoundland.

**Ctenodonta? angustata** (Hall).

- Tellinomya angustata Hall, Canadian Nat. Geol., 5, 1860, p. 152.  
Silurian: Arisaig, Nova Scotia.

**Ctenodonta astartæformis** Salter.

- Ctenodonta astartæformis* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 39, pl. 8, figs. 7, 7a.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, figs. 164 a, b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 184 (loc. ccc.).—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394.  
*Ctenodonta* cf. *astartæformis* Ruedemann, Bull. New York State Mus., 49, 1901, p. 28.  
Tellinomya astartæformis Miller, N. A. Geol. Pal., 1889, p. 515 (gen. ref.).  
Black River: Allumette Island, Ottawa River, Canada (Leray); Lake Winnipeg, Manitoba.

**Ctenodonta? attenuata** (Hall).

- Tellinomya attenuata Hall, Canadian Nat. Geol., 5, 1860, p. 151.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1164.  
Silurian: Arisaig, Nova Scotia.

**Ctenodonta auburnensis** Branson.

- Ctenodonta auburnensis* Branson, Trans. Acad. Sci. St. Louis, 18, No. 4, 1909, p. 40, pl. 7, figs. 2-4.  
Black River (Auburn-Decorah): Lincoln County, Missouri.

**Ctenodonta baffinensis** Ulrich.

- Ctenodonta baffinensis* Ulrich in Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 161, pl. 13, figs. 7-10.  
Mohawkian: Head of Frobisher Bay, Baffin Land.

**Ctenodonta bidorsata** Raymond.

- Ctenodonta? bidorsata* Raymond, Ann. Carnegie Mus., 3, 1906, p. 577.  
Chazy (Crown Point): Valcour Island, New York.

**Ctenodonta calvini** Ulrich.

- Ctenodonta calvini* Ulrich, Geol. Minnesota, 3, 1894, p. 596, pl. 42, figs. 61-64.—  
Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502n.  
Tellinomya calvini Miller, N. A. Geol. Pal., 1897, p. 785 (gen. ref.).  
Richmond (Maquoketa): Graf, etc., Iowa; Scales Mound, Illinois.  
*Cotypes*.—Cat. No. 46124, U.S.N.M.

**Ctenodonta candens** (Sardeson).

- Tellinomya candens, Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 339, pl. 6, fig. 24; p. 343.  
Black River (Decorah): Minneapolis, Minnesota.



**Ctenodonta carinata** Ulrich.

*Ctenodonta carinata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 589, pl. 42, figs. 41-43.

*Tellinomya carinata* Miller, N. A. Geol. Pal., 2d App., 1897, p. 785 (gen. ref.).

Trenton (Prosser): East of Fountain, Minnesota.

*Cotypes*.—Cat. No. 46124, U.S.N.M.

**Ctenodonta carpenderi** Schuchert.

*Ctenodonta carpenderi* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 160, pl. 13, figs. 1-3.

Mohawkian: Head of Frobisher Bay, Baffin Land.

*Cotypes*.—Cat. No. 28164, U.S.N.M.

**Ctenodonta cingulata** (Ulrich).

*Tellinomya cingulata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 23, pl. 7, figs. 19, 19a.

*Ctenodonta cingulata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 680, pl. 48, figs. 10-12.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 997, pl. 44, figs. 5, 5a.

Richmond: Marble Hill, near Madison, Indiana; Dayton, Ohio; Boyle and Oldham Counties, Kentucky.

*Holotype* and *plesiotypes*.—Cat. Nos. 46126, 46127, U.S.N.M.

**Ctenodonta clarkel** Bassler (new name).

*Tellinomya pulchella* Clarke (not Hall, 1856), Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 17, pl. 2, figs. 13-15.

Silurian: Rio Trombetas, Brazil.

**Ctenodonta clintonensis** (Foerste).

*Tellinomya* (Nucula?) *Clintonensis* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 563, pl. 37, fig. 15.

Clinton: Near Mifflintown, Juniata County, Pennsylvania.

**Ctenodonta compressa** (Ulrich).

*Tellinomya compressa* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 216, fig. 2.

*Ctenodonta compressa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 600, pl. 37, fig. 29; pl. 42, figs. 88-90.

Black River (Decorah): Goodhue County, Minnesota.

*Holotype* and *plesiotypes*.—Cat. No. 46128, U.S.N.M.

**Ctenodonta contracta** Salter.

*Ctenodonta contracta* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 37, pl. 8, figs. 4, 5.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, fig. 160a, b.

*Tellinomya contracta* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 76, pl. 11, 1884, figs. 15, 15a.

*Tellinomya cuneata* Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 183 (ext., p. 143), figs. 6, 7 (not described; probably in error for *contracta*); Rep. Geol. Surv. Wisconsin, 1862, p. 38, figs. 1, 2.

Black River (Leray): Pauquettes Rapids, Ottawa River, etc., Canada.

Upper Pogonip: Eureka and White Pine Districts, Nevada.

*Plesiotype*.—Cat. No. 17284, U. S. N.M. (Walcott).

**Ctenodonta costata** Branson.

*Ctenodonta costata* Branson, Trans. Acad. Sci. St. Louis, 18, No. 4, 1909, p. 40, pl. 7, figs. 7, 8.

Black River (Auburn-Decorah): Lincoln County, Missouri.

**Ctenodonta cuneiformis** Ulrich.

*Ctenodonta cuneiformis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 587, pl. 42, figs. 31-33.

*Tellinomya cuneiformis* Miller, N. A. Geol. Pal., 1897, p. 785 (gen. ref.).

Black River (Decorah): Six miles south of Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 46129, U.S.N.M.

**Ctenodonta curta** (Hall).

*Tellinomya curta* Hall, Pal. New York, 2, 1852, p. 86, pl. 27, figs. 10, 13.

Lower Clinton: Wolcott, Wayne County, New York.

**Ctenodonta declivis** Ruedemann.

*Ctenodonta declivis* Ruedemann, Bull. New York State Mus., 162, 1912, p. 101, pl. 6, figs. 2, 3.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

**Ctenodonta diminuens** (Simpson).

*Tellinomya (Palæoneilo) diminuens* Simpson, Trans. Amer. Philos. Soc., n. s., 16, 1889, p. 453, fig. 22.—Simpson in Lesley Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1165, fig.

*Tellinomya cuneata* Simpson in Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1164, fig.

*Tellinomya (Palæoneilo) cuneata* Simpson, Trans. Amer. Philos. Soc., n. s., 16, 1889, p. 453, fig. 21.

Clinton: Near Lewistown and Orbisonia, Pennsylvania.

**Ctenodonta donaciformis** (Hall).

*Nucula? donaciformis* Hall, Pal. New York, 1, 1847, p. 316.

*Tellinomya donaciformis* Hall, Canadian Nat. Geol., 1, 1856, p. 395 (gen. ref.).

*Ctenodonta donaciformis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Trenton: Middleville, New York.

**Ctenodonta dubia** (Hall).

*Tellinomya dubia* Hall, Pal. New York, 1, 1847, p. 153, pl. 34, figs. 6a-f; Canadian Nat. Geol., 1, 1856, p. 392, figs. 4, 5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1165, figs.

*Lyonsia dubia* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, figs. 7, 8, 12, 13.

*Ctenodonta dubia* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, fig. 163a, b.

Trenton: Middleville, Watertown, Trenton Falls, etc., New York.

**Ctenodonta dubiaformis** Raymond.

*Ctenodonta dubiaformis* Raymond, Amer. Jour. Sci., 20, 1905, p. 371.

Chazy (Crown Point): Sloop Bay, Valcour Island, New York.

**Ctenodonta elliptica** (Hall).

*Tellinomya elliptica* Hall, Pal. New York, 2, 1852, p. 102, pl. 30, fig. 4b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1165, fig.—Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 562, pl. 37, figs. 4a-c.

Upper Clinton: Near Mohawk, New York.

Upper Medinan (Brassfield): Todds Fork near Wilmington, Ohio.

**Ctenodonta equilatera** (Hall).

*Tellinomya? equilatera* Hall, Pal. New York, 2, 1852, p. 330, pl. 75, fig. 1a-d.—Grabau, Bull. New York State Mus., 92, 1906, p. 109, fig. 15.



**Ctenodonta equilatera**—Continued.

*Tellinomya* (*Ctenodonta*) *equilatera* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 520 (gen. ref.).

*Ctenodonta equilatera* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 395. Cayugan (Cobleskill): Schoharie, New York.

**Ctenodonta fecunda** (Hall).

*Nucula* (*Tellinomya*) *fecunda* Hall, Geol. Surv. Wisconsin, 1, 1862, p. 55, fig. 1.

*Ctenodonta fecunda* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 595, pl. 42, figs.

67-73.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502g-h.

Richmond (Maquoketa): Dubuque, Iowa; Scales Mound, Illinois; Wisconsin; Minnesota.

*Plesiotypes*.—Cat. No. 46130, U.S.N.M.

**Ctenodonta filistriata** Ulrich.

*Tellinomya levata* Hall and Whitfield (not Hall, 1847), Pal. Ohio, 2, 1875, p. 82.

*Ctenodonta filistriata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 599, fig. 44a-e.

Eden: Covington, Kentucky, and vicinity.

*Cotypes*.—Cat. No. 46131, U.S.N.M.

**Ctenodonta frobisherensis** Schuchert.

*Ctenodonta frobisherensis* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 161, pl. 13, figs. 11-14.

Mohawkian: Head of Frobisher Bay, Baffin Land.

*Cotypes*.—Cat. No. 28165, U.S.N.M.

**Ctenodonta gibberula** Salter.

*Ctenodonta gibberula* Salter, Canadian Org. Rem., dec. 1, 1857, p. 38, pl. 8, fig.

6.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 587, pl. 42, fig. 37; fig. 44f-g, p.

599.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 393, fig. 502c-d.

*Tellinomya ventricosa* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 27; Rep.

Geol. Surv. Wisconsin, 1862, p. 38, fig. 4.—Meek and Worthen, Geol. Surv.

Illinois, 3, 1868, p. 307, pl. 2, figs. 7a-c.—Chamberlin, Geol. Wisconsin, 1,

1883, p. 156.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 51,

pl. 6, figs. 1-4.

Black River: Pauquette Rapids, etc., Canada (Leray), Beloit, Wisconsin; Minnesota; Illinois; Iowa; etc.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Plesiotype*.—Cat. No. 46132, U.S.N.M.

**Ctenodonta gibbosa** (Hall).

*Tellinomya gibbosa* Hall, Pal. New York, 1, 1847, p. 153, pl. 34, figs. 5a,b.—Les-

ley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1168, figs.

*Tellinomya* (*Ctenodonta*) *gibbosa* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 520 (gen. ref.).

*Lyonsia gibbosa* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, fig. 3.

*Ctenodonta gibbosa* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 176, fig. 165.

Trenton: Middleville, New York.

**Ctenodonta hamburgensis** (Walcott).

*Tellinomya Hamburgensis* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 76, pl. 11, figs. 1, 1a.

*Ctenodonta hamburgensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 605, pl. 42, figs. 91, 92.

Upper Pogonip: Eureka District, Nevada.

Black River (Decorah): Chatfield, Minnesota.

*Holotype* and *plesiotype*.—Cat. Nos. 17286, 46133, U.S.N.M.

**Ctenodonta hartsvillensis** Safford.

*Ctenodonta hartsvillensis* Safford, *Geol. Tennessee*, 1869, p. 287, pl. 2 (1'), figs. 3a-f.

*Tellinomya* (*Ctenodonta*) *hartsvillensis* Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1890, p. 1168, figs.

Trenton: Hartsville, etc., Tennessee (Catheys); Kentucky (Flanagan).

**Ctenodonta? hilli** (Miller).

*Tellinomya hilli* Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 230, fig. 20; *N. A. Geol. Pal.*, 1889, p. 515, fig. 931.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1021, pl. 48, fig. 6.

*Ctenodonta? hilli* Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 581 (gen. ref.).

Richmond (Whitewater-Saluda): Near Osgood, Indiana.

**Ctenodonta inflata** (Hall).

*Tellinomya inflata* Hall, Rep. *Geol. Surv. Wisconsin*, 1861, p. 26; 1862, p. 38, figs. 4, 5.—Whitfield, *Mem. Amer. Mus. Nat. Hist.*, 1, pt. 2, 1895, p. 49, pl. 6, figs. 10-12.

Black River (Platteville): Mineral Point, Wisconsin.

**Ctenodonta intermedia** (Ulrich).

*Tellinomya intermedia* Ulrich, 19th Ann. Rep. *Geol. Nat. Hist. Surv. Minnesota*, 1892, p. 218, text fig. 4.

*Ctenodonta intermedia* Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 601, pl. 42, figs. 95-97.

Trenton (Prosser): Wykoff, etc., Minnesota.

*Cotypes*.—Cat. No. 46134, U.S.N.M.

**Ctenodonta iphigenia** Billings.

*Ctenodonta Iphigenia* Billings, *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 216, fig. 221; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 152, fig. 132 (adv. sheets 1862).

*Tellinomya Iphigenia* Miller, *N. A. Geol. Pal.*, 1889, p. 515 (gen. ref.).

Richmond: Cape Smyth, Lake Huron.

**Ctenodonta jerseyensis** Weller.

*Ctenodonta jerseyensis* Weller, *Geol. Surv. New Jersey*, *Pal.*, 3, 1903, p. 164, pl. 11, fig. 17.

Black River (Jacksonburg): Jacksonburg, New Jersey.

**Ctenodonta? lata** (Hall).

*Tellinomya lata* Hall, *Pal. New York*, 2, 1852, p. 85, pl. 27, fig. 7.

Clinton: Wolcott, New York.

**Ctenodonta levata** (Hall).

*Nucula levata* Hall, *Pal. New York*, 1, 1847, p. 150, pl. 34, figs. 1a-i.—McCoy, *Brit. Pal. Rocks and Foss.*, 1854, p. 285, pl. 1 K, figs. 4, 5.

*Leda levata* Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 173, pl. 14, fig. 10.

*Tellinomya levata* Hall, *Canadian Nat. Geol.*, 1, 1856, p. 395 (gen. ref.).—Hitchcock, *Geol. Vermont*, 1, 1861, p. 295.—Hall, *Desc. N. Sp. Fossils*, *Cincinnati*, Ohio, 1871, pl. 3, fig. 27.—Emerson, *Narrative Hall's 2d Arctic Exped.*, U. S. Navy Dep., 1879, p. 578, fig. 3.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1890, p. 1168, figs.

*Tellinomya* (*Ctenodonta*) *levata* Clarke and Ruedemann, *Bull. New York State Mus.*, 65, 1903, p. 521 (gen. ref.).



**Ctenodonta levata**—Continued.

- Ctenodonta levata* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, figs. 162a, b.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 165, pl. 11, figs. 18–22.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 100, pl. 6, fig. 1.  
Trenton: Middleville, Trenton Falls, etc., New York; New Jersey; Pennsylvania; Kentucky, etc.

**CTENODONTA LIMBATA** Raymond. See *Vanuxemia limbata*.

**CTENODONTA LOGANI** Salter (part). See *Ctenodonta nasuta*.

**Ctenodonta logani** Salter.

- Tellinomya dubia* Hall (not Hall, 1847), 10th Ann. Rep. Reg. Univ. New York, 1857, p. 183, figs. 4, 5.  
*Ctenodonta logani* Salter, Canadian Org. Rem., dec. 1, 1859, p. 36, pl. 8, figs. 3, 3a.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 591, pl. 42, figs. 26–28.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502a–b.  
Black River: Pauquettes Rapids, Ottawa River, etc., Canada (Leray); Beloit, Wisconsin (Platteville).

**Ctenodonta longa** (Ulrich).

- Tellinomya longa* Ulrich, Amer. Geol., 10, 1892, p. 103, pl. 7, figs. 17, 18.  
*Ctenodonta longa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 590, pl. 38, figs. 30, 31.  
Black River (Decorah): Goodhue County, Minnesota.  
*Holotype*.—Cat. No. 46135, U.S.N.M.

**Ctenodonta lorrainensis** Foerste.

- Ctenodonta lorrainensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 305, pl. 3, figs. 8a–b.  
Cincinnati (Pulaski): Near Worthville and Lorraine, New York; Chambly, Quebec.

**Ctenodonta machæriformis** (Hall).

- Nucula machæriformis* Hall, Geol. Rep. 4th Dist. New York, 1843, p. 76, fig. 2; tab. ill. 8, fig. 2.—Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 306, fig. 2.  
*Tellinomya machæriformis* Hall, Pal. New York, 2, 1852, p. 85, pl. 27, figs. 8a–d, 9.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1169, fig.  
*Ctenodonta machæriformis* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394.  
*Cypricardia?* *angusta* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 76, fig. 6; tab. ill. 8, fig. 6.—Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 306, fig. 6.  
*Cypricardites angustus* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 178, fig.  
Lower Clinton: Wolcott, New York.

**Ctenodonta mactriformis** (Hall).

- Nucula mactræformis* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 76, fig. 4; tab. ill. 8, fig. 4.  
*Nucula mactriformis* Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 306, fig. 4.  
*Tellinomya mactriformis* Miller, N. A. Geol. Pal., 1889, p. 515 (gen. ref.)—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1169, fig.  
Lower Clinton: New York.

**Ctenodonta madisonensis** Ulrich.

- Ctenodonta madisonensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 597, pl. 42, figs. 65–66.  
Richmond (Arnheim): Madison, Indiana.  
*Holotype*.—Cat. No. 46136, U.S.N.M.

**Ctenodonta medialis** Ulrich.

*Ctenodonta medialis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 593, pl. 42, figs. 50-52.

Black River (Decorah): Minneapolis, and near Cannon Falls Minnesota; Lincoln County, Missouri.

*Cotypes*.—Cat. Nos. 46137, 46138, U.S.N.M.

**Ctenodonta minima** (Foerste).

*Nucula minima* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 93, pl. 14, figs. 8a-c.

*Tellinomya* (*Nucula*?) *minima* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 563, pl. 26, figs. 8a-c; pl. 37, figs. 13a-c.

Upper Medinan (Brassfield): Huffman's Quarry, near Dayton, Ohio.

**Ctenodonta nasuta** (Hall).

*Tellinomya nasuta* Hall, Pal. New York, 1, 1847, p. 152, pl. 34, figs. 3a-c.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 534, pl. 79, fig. 19.—Hall, Canadian Nat. Geol., 1, 1856, p. 392, figs. 1-3; 10th Rep. New York State Cab. Nat. Hist., 1857, p. 183 (ext., p. 143), fig. 2 (part).—Hitchcock, Geol. Vermont, 1, 1861, p. 296, fig. 204.—Whitfield, Geol. Wisconsin, 4, 1882, p. 207, pl. 5, fig. 12.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 156, fig.—Miller, N. A. Geol. Pal., 1889, p. 515, fig. 932.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1169, fig.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 446, pl. 10, fig. 1.

*Tellinomya* (*Ctenodonta*) *nasuta* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 521 (gen. ref.).

*Lyonsia nasuta* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, fig. 40.

*Ctenodonta logani* Salter, (not Salter, 1859), Rep. Brit. Assoc. Adv. Sci., 1851 p. 63.

*Ctenodonta nasuta* Salter, Canadian Org. Rem., dec. 1, 1859, p. 35, pl. 8, figs. 1, 2.—Billings, Canadian Nat. Geol., 4, 1859, p. 446; Geol. Canada, Geol. Surv. Canada, 1863, p. 176, figs. 166a, b.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 4, fig. 15a.—Ehlert, Bull. Soc. Geol. France, 3d ser., 16, 1888, p. 663, pl. 16, figs. 3-3b.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 584, pl. 42, fig. 30.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 163, pl. 11, fig. 1.—Whiteaves, Ottawa Naturalist, 22, 1908, p. 106.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 393, fig. 502o.

Trenton: Trenton Falls, etc., New York.

Black River: Pauquettes Rapids, Ottawa River, etc., Canada; New Jersey; Indiana; Wisconsin; Missouri; Illinois; Minnesota; etc.

*Plesiotype*.—Cat. No. 46137, U.S.N.M.

**Ctenodonta nasuta robusta** Ulrich.

*Tellinomya nasuta* Hall (part), 10th Rep., New York State Cab. Nat. Hist., 1857, p. 183, figs. 1, 3.

*Ctenodonta nasuta* var. *robusta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 585, pl. 42, fig. 30.

Black River: Beloit, Wisconsin (Platteville); Pauquettes Rapids, Ottawa River, Canada (Leray).

*Holotype*.—Cat. No. 46140, U.S.N.M.

**Ctenodonta nitida** (Ulrich).

*Tellinomya nitida* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 215, fig. 1.



**Ctenodonta nitida**—Continued.

*Ctenodonta nitida* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 592, pl. 42, figs. 44-49.

Black River (Decorah): Minneapolis, etc., Minnesota.

*Cotypes*.—Cat. No. 46141, U.S.N.M.

**Ctenodonta novicia** (Sardeson).

*Tellinomya novicia* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 74, pl. 3, fig. 3.

St. Peter: South St. Paul and Daytons Bluff, Minnesota.

**Ctenodonta? nucleiformis** (Hall).

*Tellinomya nucleiformis* Hall, Pal. New York, 3, 1859, p. 263, pl. 49, fig. 1.

Cayugan (Manlius): Winfield, Herkimer County, New York.

**Ctenodonta nuculiformis** (Hall).

*Modiolopsis? nuculiformis* Hall, Pal. New York, 1, 1847, p. 298, pl. 82, figs. 5a, b.

*Tellinomya nuculiformis* Miller, N. A. Geol. Pal., 1889, p. 515 (gen. ref.).

*Lyonsia nuculiformis* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 172.

*Ctenodonta nuculiformis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Utica: Turin and Waterford, New York.

**Ctenodonta obliqua** (Hall).

*Nucula obliqua* Hall, Amer. Jour. Sci. and Arts, 43, 1845, p. 292.

*Tellinomya? obliqua* Meek, Pal. Ohio, 1, 1873, p. 139, pl. 11, figs. 11a-c.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 229.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1169, figs.

*Ctenodonta obliqua* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 604, pl. 42, figs. 83-87.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502i-j.

*Palaeoconcha obliqua* Miller, N. A. Geol. Pal., 1889, p. 498 (gen. ref.).

*Palaeoconcha faberi* Miller, N. A. Geol. Pal., 1889, p. 498, fig. 878.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 150.

Trenton-Richmond: Cincinnati, Ohio, and vicinity; Kentucky; Tennessee; Illinois; Iowa; etc.

*Plesiotypes*.—Cat. No. 46142, 46143, U.S.N.M.

**Ctenodonta ohioensis** Bassler (new name).

*Tellinomya* (*Nucula?*) *socialis* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 563, pl. 37, figs. 12a-c.

Upper Medinan (Brassfield): Near Dayton, Ohio.

**Ctenodonta ovata** (Hall).

*Tellinomya ovata* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 28.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 52, pl. 6, fig. 9.

*Ctenodonta ovata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Black River (Platteville): Beloit, Wisconsin.

**Ctenodonta oviformis** Ulrich.

*Ctenodonta oviformis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 586, pl. 42, fig. 29.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Black River (Auburn): Lincoln County, Missouri.

*Holotype*.—Cat. No. 46144, U.S.N.M.

**Ctenodonta parvidens** Raymond.

*Ctenodonta parvidens* Raymond, Amer. Jour. Sci., 20, 1905, p. 372.—Whiteaves, Ottawa Nat., 22, 1908, p. 113, pl. 3, fig. 16.

Chazy (Aylmer): Hog Back, Ottawa, Ontario.

**Ctenodonta pectunculoides** (Hall).

*Tellinomya pectunculoides* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 228, pl. 7, fig. 26. (Separate, 1871, p. 4, pl. 3, fig. 26.)—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 229.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 81, pl. 1, fig. 24.—Lesley, Geol. Surv. Pennsylvania' Rep. P 4, 1890, p. 1169, fig.

Eden-Maysville: Cincinnati, Ohio, and vicinity.

**Ctenodonta peracuta** Raymond.

*Ctenodonta peracuta* Raymond, Amer. Jour. Sci., 20, 1905, p. 371.

Chazy (Crown Point, Valcour): Sloop Bay, Valcour Island, New York.

**Ctenodonta perminuta** Ulrich.

*Ctenodonta perminuta* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 680, pl. 46, figs. 11–14.

Eden-Maysville: Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 46145, U.S.N.M.

**Ctenodonta planodorsata** (Ulrich).

*Tellinomya planodorsata* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 217, fig. 3.

*Ctenodonta planodorsata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 589, pl. 37, figs. 25–28; pl. 42, figs. 38–40.

Black River (Decorah): Cannon Falls, etc., Minnesota.

*Holotype* and *plesiotypes*.—Cat. No. 46146, U.S.N.M.

**Ctenodonta prosseri** Ruedemann.

*Ctenodonta prosseri* Ruedemann, Bull. New York State Mus., 162, 1912, pl. 6, figs. 4, 5.

Trenton (Snake Hill): Snake Hill, etc., Saratoga and Albany Counties, New York.

**Ctenodonta pulchella** (Hall).

*Lyrodesma pulchella* Hall, Pal. New York, 1, 1847, p. 302, pl. 82, figs. 12a–d.

*Tellinomya pulchella* Hall, Canadian Nat. Geol., 1, 1856, p. 395 (gen. ref.).

*Leda pulchella* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 173.

*Ctenodonta pulchella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Trenton: Near Watertown, etc., New York.

**Ctenodonta radiata** Ruedemann.

*Ctenodonta radiata* Ruedemann, Bull. New York State Mus., 162, 1912, p. 102, pl. 6, fig. 6.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

**Ctenodonta recta** Ruedemann.

*Ctenodonta recta* Ruedemann, Bull. New York State Mus., 162, 1912, p. 102, pl. 6, figs. 7, 8.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

**Ctenodonta recurva** (Ulrich).

*Tellinomya recurva* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 221, fig. 7.

*Ctenodonta recurva* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 603, pl. 42, figs. 98–101.

Richmond: Spring Valley, etc.; Minnesota; Oxford, Waynesville, etc., Ohio; Richmond, Indiana.

*Cotypes*.—Cat. No. 46147, U.S.N.M.



**Ctenodonta retrorsa** Ulrich.

*Ctenodonta retrorsa* Ulrich, Geol. Surv. Ohio, 1893, p. 679, pl. 50, figs. 14, 15.  
Trenton (Hermitage): Near Burgin, Kentucky.  
*Holotype*.—Cat. No. 46149, U.S.N.M.

**Ctenodonta sanguinolaroidea** (Hall).

*Tellinomya sanguinolaroidea* Hall, Pal. New York, 1, 1847, p. 152, pl. 34, figs. 4a, b.  
*Tellinomya* (*Ctenodonta*) *sanguinolaroidea* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 521 (gen. ref.).  
*Lyonsia sanguinolaroidea* D'Orbigny, Prodr. Pal., 1, 1850, p. 10 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, fig. 2.  
Trenton: Canajoharie and Middleville, New York.

**Ctenodonta scofieldi** Ulrich.

*Ctenodonta scofieldi* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 593, pl. 42, figs. 53–58.  
*Tellinomya scofieldi* Miller, N. A. Geol. Pal., 2d App., 1897, p. 785 (gen. ref.).  
Black River (Decorah): Cannon Falls and Minneapolis, Minnesota.  
*Cotypes*.—Cat. Nos. 46150, 46151, U.S.N.M.

**Ctenodonta similis** (Ulrich).

*Tellinomya similis* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, March, 1892, p. 220, fig. 6.  
*Ctenodonta similis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 604, pl. 42, figs. 102–106.  
*Tellinomya* (*Nucula*) *lepida* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, April, 1892, p. 339, pl. 6, figs. 18–20.  
Richmond: Spring Valley, etc., Minnesota; Blanchester, Ohio.  
*Cotypes* and *plesiotypes*.—Cat. Nos. 46147, 46152, U.S.N.M.

**Ctenodonta simulatrix** Ulrich.

*Ctenodonta simulatrix* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 600, pl. 42, figs. 74, 75.  
Richmond (Maquoketa): Near Spring Valley, Minnesota.  
*Holotype*.—Cat. No. 46153, U.S.N.M.

**Ctenodonta sinuosa** (Simpson).

*Nucula sinuosa* Simpson, Trans. Amer. Phil. Soc., n. s., 16, 1890, p. 451, fig. 19.  
Clinton: Seven miles northwest of Lewistown, Pennsylvania.

**Ctenodonta socialis** Ulrich.

*Ctenodonta socialis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 594, pl. 42, figs. 59, 60.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502e–f.  
*Tellinomya socialis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 785 (gen. ref.).  
Black River (Decorah): Minneapolis, Chatfield, etc., Minnesota.  
Trenton (Hermitage): Central Kentucky.  
*Cotypes*.—Cat. Nos. 46154, 46155, U.S.N.M.

**Ctenodonta subcuneata** Ruedemann.

*Ctenodonta subcuneata* Ruedemann, Bull. New York State Mus., 162, 1912, p. 103, pl. 6, figs. 9, 10.  
Trenton (Snake Hill), Snake Hill, Saratoga County, New York.

**Ctenodonta subelliptica** Savage.

Ctenodonta subelliptica Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 93, pl. 5, fig. 25.

Upper Medinan (Edgewood): Near Edgewood, Missouri.

**Ctenodonta subnasuta** Ulrich.

Ctenodonta subnasuta Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 585, pl. 42, figs. 34-36.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 185.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 160, pl. 13, figs. 4-6.

Trenton: Near Cannon Falls, Minnesota (Prosser); Lake Winnipeg and Baffin Land, Canada.

*Holotype* and *plesiotype*.—Cat. Nos. 46156, 28163, U.S.N.M.

**Ctenodonta subovata** Whiteaves.

Ctenodonta subovata Whiteaves, Ann. Rep. Geol. Surv. Canada, n. s., 14, App. F, 1904, p. 47; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 256, pl. 27, figs. 9, 9a.

Niagaran: Ekwam River, Canada.

**Ctenodonta subrecta** (Clarke).

Tellinomya subrecta Clarke, Archivos. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 17, pl. 2, fig. 16.

Silurian: Rio Trombetas, Brazil.

**Ctenodonta subrotunda** (Ulrich).

Tellinomya subrotunda Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 219, fig. 5.

Ctenodonta subrotunda Hayes and Ulrich, U. S. Geol. Surv. Folio 95, illus. sheet, 1903, figs. 40, 41.

Trenton: Mercer County, Kentucky (Curdsville); near Cannon Falls, Minnesota (Prosser); Tennessee (Bigby).

*Holotype*.—Cat. No. 46157, U.S.N.M.

**Ctenodonta subtrigona** (Simpson).

Nucula subtrigona Simpson in Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 472, figs.; Trans. Amer. Phil. Soc., n. s., 16, p. 452, fig. 20.

Clinton: Orbisonia, Huntington County, Pennsylvania.

**CTENOPLEURON** Matthew.

Genotype: *C. nerepisense* Matthew.

Ctenopleuron Matthew, Trans. Royal Soc. Canada, 3d ser., 1, sec. 4, 1907, p. 7.

**Ctenopleuron nerepisense** Matthew.

Ctenopleuron nerepisense Matthew, Trans. Royal Soc. Canada, 3d ser., 1, sec. 4, 1907, p. 7, 1 pl.

Clinton?: Cunningham Brook, near Nerepis Station, Kings County, New Brunswick.

**CTENOPTERUS** Clarke and Ruedemann. See *Stylonurus* subgenus *Ctenopterus*.

**CTENOPYGE** Linnarsson. Genotype: *Olenus* (*Sphærophthalmus*) *pecten* Salter.

Ctenopyge Linnarsson, Geol. Fören. Stockholm Forh., 5, 1880, p. 145; Sver. Geol. Unders., ser. C, No. 43, 1880, p. 15.—Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 113.—Zittel, Handb. d. Pal., 2, 1885, p. 596.—Matthew Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 55.—Koken, Die Leitfossilien, Leipzig, 1896, p. 20, fig. 11; figs. 7, 14.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., No. 8, 1901, pp. 26, 29.—Lake, Paleontographical Soc., 1913, p. 78.



**Ctenopyge acadica** Matthew.

*Ctenopyge acadica* Matthew, Trans. Royal Soc. Canada, 11, sec. 4, 1894, p. 109, pl. 17, figs. 13a-e.

Canadian (Bretonian—Div. C3b): St. John, New Brunswick.

*CTENOPYGE FLAGELLIFER* Angelin. See *Sphærophthalmus flagellifer*.

**Ctenopyge? lobata** (Brögger).

*Leptoplastus* (*Ctenopyge*?) *lobata* Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 121, pl. 12, fig. 11.

*Ctenopyge lobata*? Matthew, Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 223.

Lower Ordovician: Europe; McNeil Brook, Cape Breton, Nova Scotia (Bretonian—Div. C3b).

**Ctenopyge pecten** (Salter).

*Olenus* (*Sphærophthalmus*) *pecten* Salter, Mem. Geol. Surv., dec. 11, 1864, p. 9, pl. 8, figs. 11, 13; Quart. Jour. Geol. Soc. London, 21, 1865, p. 481, figs. 4, 5.

*Ctenopyge pecten* Linnarsson, Geol. For. Stockholm Forh., 5, 1880, p. 146 (cites bibliography); Afh. Sveriges Geol. Unders, ser. C, No. 43, 1880, p. 16, pl. 2, figs. 3-9.—Lake, Paleontographical Soc., 1913, p. 85 (see for complete bibliography).

Lower Ordovician: Great Britain; East Bay, east of Bras d'Or Lake, Cape Breton, Nova Scotia; St. John, New Brunswick (Bretonian—Div. C3a, b).

**Ctenopyge spectabilis** (Brögger).

*Leptoplastus* (*Ctenopyge*) *spectabilis* Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 120, pl. 2, fig. 18a, b; pl. 12, fig. 12a-c.

*Ctenopyge spectabilis* var. Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 57, pl. 13, figs. 13a, b.

*Ctenopyge spectabilis* Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 51.

Lower Ordovician: Europe; St. John, New Brunswick (Bretonian—Div. C3b).

**CUNEAMYA** Hall and Whitfield. Genotype: *C. miamiensis* Hall and Whitfield.

*Cuneamya* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 90.—Zittel, Handb. Pal., 2, 1881, p. 128.—Miller, N. A. Geol. Pal., 1889, p. 473.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 620.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 378.

**Cuneamya acutifrons** Ulrich.

*Cuneamya acutifrons* Ulrich in Ruedemann, Bull. New York State Mus., 162, 1912, p. 106, pl. 6, figs. 15, 16, text fig. 30.

Trenton: Covington, Kentucky; Snake Hill, Saratoga County, New York (Snake Hill).

*Holotype*.—Cat. No. 47314, U.S.N.M.

**Cuneamya alveata** Whitfield and Hovey.

*Orthonota curta*? Hall (not Hall, 1843), Pal. New York, 2, 1852, pp. 86, 285, pl. 27, figs. 11a, b; pl. 59, fig. 8.

*Cuneamya alveata* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, 1899, pt. 2, p. 188.

Lower Clinton: Walcott, New York.

**Cuneamya? caswelli** (Foerste).

*Grammysia Caswelli* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 92, pl. 14, figs. 12a, b.

**Cuneamya? caswelli**—Continued.

Cypriocardites Caswelli Foerste, Geol. Surv. Ohio Pal., 7, 1893, p. 561, pl. 26, figs. 12a, b; pl. 37, figs. 1a-c.

Upper Medinan (Brassfield): Soldier's Home, near Dayton, Ohio.

**Cuneamya coriformis** Miller.

Cuneamya coriformis Miller, N. A. Geol. Pal., 1889, p. 474, figs. 805, 806.

Maysville (McMillan): Cincinnati, Ohio.

**Cuneamya curta** Whitfield.

Cuneamya curta Whitfield, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 138, pl. 6, figs. 6, 6a.—Ulrich, Geol. Minnesota, 3, 1894, pt. 2, p. 477, fig. 35.

Richmond (Waynesville): Clarksville, etc., Ohio.

*Plesiotype*.—Cat. No. 46158, U.S.N.M.

**Cuneamya elliptica** Miller.

Cuneamya elliptica Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 317, pl. 8, figs. 3, 3a.

Maysville (McMillan): Cincinnati, Ohio.

**Cuneamya miamiensis** Hall and Whitfield.

Cuneamya Miamiensis Hall and Whitfield, Geol. Surv. Ohio Pal., 2, 1875, p. 91, pl. 2, figs. 9, 10.—Miller, N. A. Geol. Pal., 1889, p. 474, figs. 807, 808.—

Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 378, fig. 481.

Richmond (Waynesville): Waynesville, etc., Ohio.

**Cuneamya neglecta** (Meek).

Sedgwickia (Grammysia?) neglecta Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 325; Geol. Surv. Ohio, Pal., 1, 1873, p. 142, pl. 12, fig. 8.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 220.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1890, p. 947, figs.

Grammysia neglecta Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 91, pl. 2, fig. 11.

Cuneamya neglecta Miller, N. A. Geol. Pal., 1889, p. 474 (gen. ref.).

Richmond (Waynesville): Clinton County, Ohio.

**Cuneamya oblonga** Ulrich.

Cuneamya oblonga Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 623, pl. 36, figs. 40-41.

Trenton (Galena): Dixon, Illinois.

*Holotype*.—Cat. No. 46159, U.S.N.M.

**Cuneamya parva** Miller.

Cuneamya parva Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1881, p. 316, pl. 8, figs. 5, 5a.

Eden (Southgate): Cincinnati, Ohio.

**Cuneamya scapha** Hall and Whitfield.

Cuneamya scapha Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 92, pl. 2, fig. 12.

Richmond (Waynesville): Near Waynesville, Ohio.

**Cuneamya scapha brevior** Foerste.

Cuneamya scapha brevior Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 307, pl. 2, fig. 12.

Cincinnati (Pulaski): Riviere des Hurons, near St. Jean Baptiste, etc., Quebec.

**CUNEAMYA SULCODORSATA** Ulrich. See *Saffordia sulcodorsata*.



**Cuneamya truncatula** Ulrich.

*Cuneamya truncatula* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 622, p. 36, fig. 39.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 162, pl. 11, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 378, fig. 482a.  
Trenton: Near Wykoff and Pleasant Grove, Minnesota (Prosser); New Jersey.  
*Holotype*.—Cat. No. 46160, U.S.N.M.

**Cuneamya vetusta** (Hall).

*Cardiomorpha vetusta* Hall, Pal. New York, 1, 1847, p. 154, pl. 34, fig. 8.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 116, text. fig.  
*Cypicardites vetusta* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).  
Trenton: Middleville, New York.

**CUPELLACRINUS CORRUGATUS** Shumard. See *Marsipocrinus corrugatus*.

**CUPELLACRINUS MAGNIFICUS** Shumard. See *Marsipocrinus magnificus*.

**CUPELLACRINUS PENTAGONALIS** Shumard. See *Marsipocrinus pentagonalis*.

**CUPELLACRINUS STELLATUS** Wachsmuth and Springer. See *Marsipocrinus pentagonalis*.

**CUPELLÆCRINITES** Troost. See *Marsipocrinus Bather*.

**CUPELLÆCRINITES BUCHII** Troost. See *Marsipocrinus tennesseensis*.

**CUPELLÆCRINITES CONICUS** Troost. See *Coccocrinus conicus*.

**CUPELLÆCRINITES INFLATUS** Troost. See *Marsipocrinus striatus*.

**CUPELLÆCRINITES LEVIS** Troost. See *Marsipocrinus tennesseensis*.

**CUPELLÆCRINUS** Meek and Worthen. See *Marsipocrinus Bather*.

**CUPELLÆCRINUS LEVIS** Shumard. See *Marsipocrinus tennesseensis*.

**CUPELLÆOCRINUS** Meek and Worthen. See *Marsipocrinus Bather*.

**CUPULOCRINUS** D'Orbigny. Genotype: *Scyphocrinus heterocostalis* Hall.

*Scyphocrinus* Hall (not Zenker, 1839), Pal. New York, 1, 1847, p. 85.

*Cupulocrinus* D'Orbigny, Prod. Pal. Strat., 1, 1849, p. 23; Cours. Elementaire de Pal. et Geol., 2, 1851, p. 144.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 224.—Zittel, Handb. Pal., 1, 1879, p. 375.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 395 (Rev. Pal., pt. 2, p. 221).—Miller, N. A. Geol. Pal., 1889, p. 235.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 202.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 28; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 215.

**Cupulocrinus conjugans** (Billings).

*Dendrocrinus conjugans* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 268; Geol. Surv. Canada, dec. 4, 1859, p. 41, pl. 4, figs. 1a, b, 2a, b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504.

*Cupulocrinus conjugans* Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 37.

*Dendrocrinus cylindricus* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 44, pl. 3, figs. 8a, 8b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Montreal, Quebec.

**Cupulocrinus heterocostalis** (Hall).

*Scyphocrinus heterocostalis* Hall, Pal. New York, 1, 1847, p. 85, pl. 28, figs. 3d, e; 12th Rep. Regents Univ. State New York, 1860, p. 75.

**Cupulocrinus heterocostalis**—Continued.

*Cupulocrinus heterocostalis* D'Orbigny, Prod. Pal. Strat., 1, 1849, p. 23 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 225.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 30, fig. 3.

Trenton: Middleville, New York.

**Cupulocrinus humilis** (Billings).

*Dendrocrinus humilis* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 270.—Geol. Surv. Canada, dec. 4, 1859, p. 39, pl. 3, fig. 4.

*Cupulocrinus humilis* Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 28, pl. 1, figs. 8, 9; pl. 3, figs. 1–3, p. 29, fig. 2.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**Cupulocrinus jewetti** (Billings).

*Dendrocrinus Jewettii* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 43, fig. 15; Trans. Ottawa Field Nat. Club., 1, 1883, p. 51, pl. figs.—Miller, N. A. Geol. Pal., 1889, p. 238, fig. 283.

*Cupulocrinus jewetti* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 28, pl. 3, figs. 5–7.

Trenton (Curdsville): Bay of Quinte, and Kirkfield, Ontario.

**Cupulocrinus jewetti kentuckiensis** Springer.

*Cupulocrinus jewetti* var. *kentuckiensis* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 28, pl. 3, figs. 8, 9.

Trenton (Curdsville): Woodford County, Kentucky.

**Cupulocrinus latibrachiatus** (Billings).

*Dendrocrinus latibrachiatus* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 270; Geol. Surv. Canada, dec. 4, 1859, p. 39, pl. 3; figs. 5a–c; Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 9 (loc. ref.).—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505.

*Cupulocrinus latibrachiatus* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 29 (gen. ref.).

Richmond (Charleton): Charleton Point, Anticosti.

**Cupulocrinus polydactylus** (Shumard).

*Homocrinus polydactylus* Shumard, Trans. Acad. Sci. St. Louis, 1, 1857, p. 78, pl. 1, figs. 6a, b.

*Poteriocrinites* (*Dendrocrinus*) *polydactylus* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1871, p. 314.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 740, fig.

*Poteriocrinus* (*Dendrocrinus*) *polydactylus* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 22, pl. 3 bis, fig. 9.

*Dendrocrinus polydactylus* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 719, pl. 3, fig. 4.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 83.

*Cupulocrinus polydactylus* Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 29 (gen. ref.).

*Cyathocrinites conglobatus* Troost, Proc. Amer. Ass. Adv. Sci., 2, 1850, p. 61 (nom. nud).

Richmond (Waynesville-Whitewater): Richmond, etc., Indiana; Oxford, etc., Ohio.

*Plesiotype*.—Cat. No. 39950, U.S.N.M. (Troost's type of *C. conglobatus*).

**CYATHASPIS** Lankester.

Genotype: *C. banksi* Huxley and Salter.

*Cyathaspis* Lankester, Rep. 24th Meeting British Asso. Adv. Sci., 1865, p. 100.

(See Hay, Bull. U. S. Geol. Surv., 179, for additional refs.)

*Diplaspis* Matthew, Bull. Nat. Hist. Soc. New Brunswick, 6, 1887, p. 69.



**Cyathaspis acadica** (Matthew).

*Pteraspis acadica* Matthew, Canadian Rec. Sci., 2, 1886, pp. 251, 323.

*Diplaspis acadica* Matthew, Trans. Royal Soc. Canada, 6, 1888, p. 49, pl. 4; Amer. Geol., 8, 1891, p. 61.

*Cyathaspis acadica* Hay, Bull. U. S. Geol. Surv., 179, 1902.

Silurian?: Nerepis Hills, near St. John, New Brunswick.

**CYATHAXONIA COLUMELLATA** Hall. See *Lindströmia? columellata*.

**CYATHAXONIA GAINESI** Davis. See *Lindströmia gainesi*.

**CYATHAXONIA HERZERI** Hall. See *Lindströmia herzeri*.

**CYATHAXONIA WISCONSINENSIS** Whitfield. See *Lindströmia wisconsinensis*.

**CYATHOCRINITES** Meek and Worthen. See *Cyathocrinus* Miller.

**CYATHOCRINITES CONGLOBATUS** Troost. See *Cupulocrinus polydactylus*.

**CYATHOCRINITES PYRIFORMIS** Hall. See *Ichthyocrinus laevis*.

**CYATHOCRINITES SCULPTUS** Troost. See *Chirocrinus angulatus*.

**CYATHOCRINITES TENNESSEEE** Troost. See *Cyathocrinus brittsi*.

**CYATHOCRINUS** Miller.

Genotype: *C. planus* Miller.

*Cyathocrinus* Miller, Nat. Hist. Crin., 1821, p. 85.—Agassiz, Ann. Nat. Hist., 1, 1838, p. 447.—Koninck, Desc. Animaux Fossiles, Leige, p. 48.—McCoy, Syn. Char. Foss. Ireland, 1844, p. 178.—Austin and Austin, Mon. Recent and Fossil Crin., 1845, p. 58, fig. 65 (1846).—D'Orbigny, Prodr. de Pal., 1, 1849, pp. 46, 103.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 50.—McCoy, British Pal. Rocks Foss., 1854, p. 76.—Koninck and Le Hon, Recher. Crin. Terr. Carb. Belgique (Mem. L'Acad. Royale Sci., 28), 1854, p. 79, fig.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 317.—Hall, Rep. Geol. Surv. Iowa, 1, pt. 2, 1858, pp. 622, 623, fig. 98.—White, Boston Jour. Nat. Hist., 7, 1863, pp. 493, 496.—Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 175; Proc. Acad. Nat. Sci. Philadelphia, 1868, p. 324; Canadian Nat., n. s., 4, 1869, p. 436; Amer. Jour. Sci. and Arts, 2d ser., 48, 1869, p. 25.—Billings, *ibid.*, p. 73, footnote.—Thomson, Proc. Royal Soc. Edinburgh, 7, 1871, p. 416.—Salter, Cat. Camb. Sil. Foss., 1873, p. 123.—Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 94, footnote.—Wachsmuth, Amer. Jour. Sci., 3d ser., 14, 1877, p. 183; Ann. Mag. Nat. Hist., 5th ser., 1, 1878, p. 455.—Angelin, Icon. Crin., 1878, p. 22.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 256; *ibid.*, 1879, p. 302 (Rev. Pal., pt. 1, p. 79); *ibid.*, 1883, p. 376, fig. 7; *ibid.*, 1887, p. 101; *ibid.*, 1890, p. 351.—Zittel, Handb. Pal., 1, 1879, p. 351.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1885, p. 822.—Miller, N. A. Geol. Pal., 1889, p. 235.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 20; pl. 15, fig. 3; *ibid.*, 9, 1892, p. 202; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, pp. 126, 127, fig. 18.—Springer, Amer. Geol., 26, 1900, p. 133.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 156.—Bather, Amer. Geol., 26, 1900, p. 308; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 173, fig. 89.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 61, fig. 33.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 35, fig. 15.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 506.

*Anthocrinus* Miller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 255.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 312 (Genotype: *A. loveni* Miller).

**CYATHOCRINUS**—Continued.

*Cyathocrinites* Meek and Worthen, Proc. Acad. Nat. Sci., Philadelphia, 1868, p. 336; Geol. Surv. Illinois, 5, 1874, p. 400.—Meek, Amer. Jour. Sci. and Arts, 3d ser., 7, 1874, p. 369.

**Cyathocrinus? æmulus** Hall.

*Cyathocrinus* (*Poteriocrinus*) *æmulus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 266; Trans. Albany Inst., 10, 1883, p. 66 (prelim. notice, 1879, p. 10.).

*Homocrinus? æmulus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 158 (Rev. Pal., pt. 3, sec. 2, p. 234).

Niagaran (Waldron): Waldron, Indiana.

**CYATHOCRINUS? ALTERNATUS** Hall. See *Dendrocrinus alternatus*.

**CYATHOCRINUS ANGULATUS** Wachsmuth and Springer. See *Palæocrinus angulatus*.

**Cyathocrinus benedicti** Miller.

*Cyathocrinus benedicti* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1892, pl. 658, p. 9, fig. 7 (adv. sheets, 1891, p. 48).

Niagaran (Waldron): Hartsville, Indiana.

**Cyathocrinus brittsi** Miller and Gurley.

*Cyathocrinites tennesseæ* Troost, Proc. Amer. Assoc. Adv. Sci., 2, 1850 (nom. nud.).

*Cyathocrinus tennesseæ* Miller, N. A. Geol. Pal., 1889, p. 237.

*Cyathocrinus brittsi* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 70, pl. 4, figs. 35, 36.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 81, pl. 15, figs. 2, 3.

Niagaran (Brownsport): Decatur County, Tennessee.

(?Burlington: Sedalia, Missouri).

Observation.—Although recorded from the Burlington, the type of *C. brittsi* is probably from the Niagaran of West Tennessee.

*Plesiotype*.—Cat. No. 39948, U.S.N.M. (Troost's type of *C. tennesseæ*).

**CYATHOCRINUS CORA** Hall. See *Crotalocrinus cora*.

**CYATHOCRINUS FASCIATUS** Hall. See *Macrostylocrinus fasciatus*.

**Cyathocrinus globosus** (Troost).

*Cyathocrinites globosus* Troost, Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Cyathocrinus globosus* Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 82, pl. 5, figs. 17, 18.

Niagaran (Brownsport): Decatur County, Tennessee.

**CYATHOCRINUS NUCLEUS** Hall. See *Botryocrinus nucleus*.

**Cyathocrinus? ovalis** Rowley.

*Cyathocrinus? ovalis* Rowley, Amer. Geol., 34, 1904, p. 271, pl. 16, figs. 13–16.

Niagaran (Bainbridge): Near St. Marys, Ste. Genevieve County, Missouri.

**CYATHOCRINUS PISIFORMIS** Whitfield. See *Lecanocrinus pisiformis*.

**CYATHOCRINUS POLYXO** Hall. See *Botryocrinus polyxo*.

**CYATHOCRINUS PULCHELLUS** Wachsmuth and Springer. See *Palæocrinus pulchellus*.

**CYATHOCRINUS PUSILLUS** Hall. See *Lecanocrinus pusillus*.

**CYATHOCRINUS PYRIFORMIS** Lesley. See *Ichthyocrinus lævis*.



**CYATHOCRINUS RHOMBIFERUS** Wachsmuth and Springer. See *Palæocrinus rhombiferus*.

**CYATHOCRINUS SCULPTUS** Wachsmuth and Springer. See *Chirocrinus angulatus*.

**CYATHOCRINUS STRIATUS** Wachsmuth and Springer. See *Palæocrinus striatus*.

**CYATHOCRINUS TENNESSEENSIS** Miller. See *Cyathocrinus brittsi*.

**Cyathocrinus turbinatus** Weller.

*Cyathocrinus turbinatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 65, pl. 14, fig. 13.

Niagaran (Racine): Chicago, Illinois.

**CYATHOCRINUS VANHORNEI** Miller. See *Crotalocrinus vanhornei*.

**CYATHOCRINUS WALDRONENSIS** Miller and Dyer. See *Dimerocrinus waldronensis*.

**CYATHOCRINUS WAUKOMA** Hall. See *Lecanocrinus waukoma*.

**CYATHODICTYA** Hall and Clarke. See *Cyathophycus Walcott*.

**CYATHOPHYCUS** Walcott.

Genotype: *C. reticulatus* Walcott.

*Cyathophycus*, Walcott, Trans. Albany Inst., 10, 1883, p. 18 (adv. sheets, 1879).—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, p. 15.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 466.—Dawson, Canadian Rec. Sci., 3, 1888, pp. 58, 67, footnote.—Miller, N. A. Geol. Pal., 1889, p. 158.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 63.—Rauff, *Palæontographica*, 40, 1894, p. 250.—James, Amer. Nat., 29, 1895, p. 542, fig. 6.

*Cyathospongia* Dawson, Canadian Rec. Sci., 3, 1888, p. 68, footnote.

*Cyathospongia* (*Cyathophycus*) Dawson and Hinde, Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 44.

*Cyathodictya* (new name for *Cyathophycus*), Hall and Clarke, Mem. New York State Mus., 2, 1898, p. 24.

**Cyathophycus quebecense** Dawson.

*Cyathophycus Quebecensis* Dawson, Canadian Rec. Sci., 3, 1888, p. 54.—Hinde, *ibid.*, p. 67.—Rauff, *Palæontographica*, 40, 1894, p. 251.—Dawson, Trans. Royal Soc. Canada, 2d ser., 2, sec. 4, 1896, p. 109, figs. 18, 19.

*Cyathospongia Quebecensis* Dawson and Hinde, Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 44, figs. 16, 17, pl. 3, fig. 7.

Canadian? (Levis?): Little Metis, Canada.

**Cyathophycus reticulatum** Walcott.

*Cyathophycus reticulatus* Walcott, Amer. Jour. Sci. Arts, 3d ser., 22, 1881, p. 395; Trans. Albany Inst., 10, 1883, p. 18, pl. 2, figs. 16, 16a-d.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 468, pl. 18, fig. 1.—Dawson, Canadian Rec. Sci., 3, 1888, p. 55.—Hinde, *ibid.*, p. 65.—Rauff, *Palæontographica*, 40, 1894, p. 252.

*Cyathodictya reticulata* Hall and Clarke, Mem. New York State Mus., 2, 1898, p. 24, pl. 1, figs. 1-13; 15th Rep. State Geol. New York for 1895, 1899, p. 764, pl. 1, figs. 1-13.

Utica: Holland Patent, Oneida County, New York.

*Plesiotype*.—Cat. No. 25349, U.S.N.M.

**CYATHOPHYCUS SILURIANA** James. See *Trichophycus siluriana*.

**CYATHOPHYCUS SUBSPHERICUS** Walcott. See *Teganium subsphericus*.

**Cyathophycus? tubulare** (Ruedemann).

*Cyathodictya? tubularis* Ruedemann, Bull. New York State Mus., 162, 1912, p. 75, figs. 8-12.

Trenton (Canajoharie): Canajoharie, New York.

**Cyathophycus(?) walcotti** (Rauff).

*Dictyophytra(?) Walcott* Rauff, Palæontographica, 40, 1894, p. 249, pl. 4, fig. 12.—Hall and Clarke, Mem. State Mus. New York, 2, 1898, p. 50.

Utica: Holland Patent, Oneida County, New York.

*Plesiotype*.—Cat. No. 25348, U.S.N.M.

*CYATHOPHYLLOIDES THOMII* Walcott. See *Columnaria* (Palæophyllum) thomi.

**CYATHOPHYLLUM** Goldfuss.

Genotype: *C. cæspitosum* Goldfuss.

*Cyathophyllum* Goldfuss, Petrefacta, 1826, pp. 54, 244.—Koninck, Desc. Animaux Fossiles, Liege, 1842, p. 20.—Dana, Wilkes' U.S. Expl. Exped., 1838-42, 7, Zoophytes, 1846, p. 355.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5, pp. 167, 360).—McCoy, British Pal. Rocks Foss., 1854, p. 69.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 455.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 364.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 51.—Lindstrom, Geol. Mag., 3, 1866, p. 359.—Koninck, Animaux Foss. Terr. Carb. Belgique (Mem. l'Acad. Royale Sci. de Belgique, 39, p. 46), 1872.—Dybowski, Archiv. f. Naturf. Liv., Ehst. und Kurl., 5, 1873, p. 336.—Rominger, Geol. Surv. Mich., 3, pt. 2, 1876, p. 98.—Zittel, Handb. Pal., 1, 1879, p. 230.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 335.—Frech, Pal. Abh. Dames and Kayser, 3, Heft 3, 1886, p. 53.—Miller, N. A. Geol. Pal., 1889, p. 181.—Sherzer, Amer. Geology, 7, 1891, pp. 290-295; Bull. Geol. Soc. Amer., 3, 1892, p. 279.—Koken, Die Leitfossilien, Leipzig, 1896, p. 309.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 727.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 128; 7, 1901, p. 138; Bull. New York State Mus., 45, 1901, p. 138.—Zittel-Eastman Textb. Pal., 1, 1900, p. 76; *ibid.*, 2d ed., 1913, p. 84.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 133.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 87.

**Cyathophyllum agglomeratum** Castelnau.

Not recognized.

*Cyathophyllum agglomeratum* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 49, pl. 21, fig. 5.

Silurian: Manitoulin Islands, Lake Huron.

**Cyathophyllum ammonis** Castelnau.

Not recognized.

*Cyathophyllum ammonis* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 21, fig. 1.

Silurian?: New York.

**Cyathophyllum anticostiense** Billings.

*Cyathophyllum Anticostiense* Billings, Pal. Foss., 1, 1865, Geol. Surv. Canada, p. 109 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).—Lambe, Ottawa Nat., 12, 1899, p. 237; Cont. Canadian, Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 134, pl. 10, figs. 5-8.

Anticostian (Jupiter River and Chicotte): Southwest Point, etc., Anticosti.

**Cyathophyllum arborescens** Castelnau.

Not recognized.

*Cyathophyllum arborescens* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 40, pl. 22, fig. 2.

Silurian: Northern shore of Lake Huron.



**Cyathophyllum articulatum** (Wahlenberg).

*Madreporites articulatus* Wahlenberg, Nov. Act. Sco. Upsala, 8, 1821, p. 87.

*Cyathophyllum articulatum* Milne-Edwards and Haime, Polyp. Foss. des. Terr.

Pal., 1851, p. 377; British Foss. Corals, 1855, p. 282, pl. 67, figs. 1, 1a.—

Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 584.—Lambe, Ottawa

Nat., 12, 1899, p. 219; Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901,

p. 135, pl. 10, figs. 9a, b.

Silurian: Gotland and England; "The Forks," Scaumenac River, Isle of Man,

Lake Temiscaming, Quebec; Dobbins Bay, Arctic America (Niagaran).

*Cyathophyllum atlas* Castelnau.

Not recognized.

*Cyathophyllum atlas* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p.

47, pl. 20, fig. 2.

Silurian: Drummond Island, Lake Huron.

**Cyathophyllum bullulatum** Hall.

*Cyathophyllum bullulatum* Hall, 35th Rep. New York State Mus. Nat. Hist.,

1884, p. 416.

Niagaran?: Perry County, Tennessee.

*Cyathophyllum caliculare* Owen.

Not recognized.

*Cyathophyllum caliculare* Owen, Geol. Expl. Iowa, Wisconsin, and Illinois, 2d

ed., 1844, p. 63, pl. 13, fig. 5.

Niagaran: Iowa and Wisconsin.

**CYATHOPHYLLUM CALYCVLUM** Foerste. See *Enterolasma calyculus*.

**CYATHOPHYLLUM CELATOR** var. **DAYTONENSIS** Foerste. See *Zaphrentis celator daytonensis*.

**Cyathophyllum clarki** Swartz.

*Cyathophyllum clarki* Swartz, Maryland Geol. Surv., Low Dev., 1913, p. 201,  
pl. 19, figs. 5-9.

Helderbergian (Keyser): Devils Backbone, near Cumberland; Pinto, etc.,  
Maryland.

*Cyathophyllum conicum* Castelnau.

Not recognized.

*Cyathophyllum conicum* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843,

p. 48, pl. 21, fig. 4.

Silurian?: Banks of the Ohio, Illinois.

**CYATHOPHYLLUM CORITHEUM** Owen. See *Ptychophyllum expansum*.

**Cyathophyllum densiseptatum** Foerste.

*Cyathophyllum densiseptatum* Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p.  
314, pl. 6, figs. 2a-f.

Clinton (Waco): Near Estill Springs, etc., Kentucky.

*Cyathophyllum dilatatum* Castelnau.

Not recognized.

*Cyathophyllum dilatatum* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843,

p. 48, pl. 21, fig. 3.

Silurian: Banks of Lake Huron.

*Cyathophyllum distinctum* Castelnau.

Not recognized.

*Cyathophyllum distinctum* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843,

p. 49, pl. 22, fig. 8.

Silurian: Manitoulin Islands, Lake Huron.

**CYATHOPHYLLUM ERIPHYLE** Billings. See *Omphyma eriphyle*.

**Cyathophyllum euryone** Billings.

*Cyathophyllum Euryone* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 110 (adv. sheets, 1862); Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 135, pl. 11, figs. 1, 1a, b.

Anticostian (Gun River-Chicotte): The Jumpers, etc., Anticosti.

**Cyathophyllum facetum** Foerste.

*Cyathophyllum facetus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 341, pl. 9, fig. 8.

Upper Medinan (Brassfield): Near Dayton, and Todds Fork, near Wilmington, Ohio.

**Cyathophyllum flos** Davis.

*Cyathophyllum flos* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 78, figs. 11-14; pl. 83, fig. 10.

Niagaran (Louisville): Near Louisville, Kentucky.

**Cyathophyllum goldfussi** Castelnau.

Not recognized.

*Cyathophyllum Goldfussii* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 47, pl. 21, fig. 2.

Silurian(?): Buffalo, New York.

**Cyathophyllum goliath** Castelnau.

Not recognized.

*Cyathophyllum Goliath* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 47, pl. 20, fig. 1.

Silurian: Drummond Island, Lake Huron.

**Cyathophyllum gracile** Troost.

Not recognized.

*Cyathophyllum gracile* Troost, 5th Geol. Rep. Tennessee, 1840, p. 63.

Silurian(?): Perry County, Tennessee.

**Cyathophyllum hydraulicum** Simpson.

*Cyathophyllum hydraulicum* (Simpson MS.) Grabau, Bull. Geol. Soc. Amer., 2, 1900, p. 364, pl. 21, figs. 1a-d; Bull. New York State Mus., 45, 1901, p. 138, fig. 31; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 138, fig. 31.—Schuchert, Amer. Geol., 31, 1903, p. 163 (loc. occ.).—Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 97, pl. 31, figs. 1a-d.

Cayugan: Erie County (Akron), and Howes Cave, near Schoharie, New York (Manlius).

**CYATHOPHYLLUM INEQUALE** Swartz. See *Prismatophyllum inequale*.**Cyathophyllum interruptum** Billings.

*Cyathophyllum interruptum* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 109 (adv. sheets 1862).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 137, pl. 11, figs. 3, 3a, b.

Silurian: L'Anse a le Barbe, Baie des Chaleurs, Quebec.

**Cyathophyllum intertrium** Hall.

*Cyathophyllum intertrium* Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 273, pl. 15, figs. 9-11; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 416 (ext. 1882, p. 12).—Lesley, Geol. Surv. Pennsylvania Rep. P. 4, 1889, p. 169, figs.

Niagaran (Louisville): Louisville, Kentucky.



**Cyathophyllum marylandicum** Swartz.

*Cyathophyllum marylandicum* Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 204, pl. 21, figs. 1, 2.

Helderbergian (Keyser): Keyser, West Virginia.

**Cyathophyllum michelini** Castelnau.

Not recognized.

*Cyathophyllum Michelini* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 3.

Silurian: Drummond Island, Lake Huron.

**CYATHOPHYLLUM MULTIPLICATUM** Owen. See *Ptychophyllum expansum*.

**CYATHOPHYLLUM NYMPHALE** Billings. See *Chonophyllum nymphae*.

**Cyathophyllum pasithea** Billings.

*Cyathophyllum Pasithea* Billings, New sp. L. Sil. Fossils, Geol. Surv. Canada, 1865, p. 112 (adv. sheets, 1862).—Lambe, Cont. Canadian Pal., Geol. Surv.

Canada, 4, pt. 2, 1901, p. 148, pl. 12, figs. 5, a, b.

Silurian: L'Anse a la Vieille, Bay of Chaleurs, Quebec.

**Cyathophyllum pauciradiatum** D'Orbigny.

*Cyathophyllum pauciradiatum* D'Orbigny, Prod. de Pal., 1847, p. 47.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 7, pl. 3, figs. 6, 7.

Silurian (?): Falls of the Ohio.

Observation.—Although considered a Silurian species and synonymous with *Amplexus shumardi*, the figures given by Boule and Thevenin refer to a Devonian species of *Blothrophyllum*.

**CYATHOPHYLLUM PELAGICUM** Billings. See *Diplophyllum caespitosum*.

**Cyathophyllum pennanti** Billings.

*Cyathophyllum Pennanti* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 107 (adv. sheets, 1862).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada,

4, pt. 2, 1901, p. 138, pl. 11, figs. 4, a, b.

Silurian: L'Anse a Gascon, Bay of Chaleurs, Quebec.

**Cyathophyllum pickthorni** (Salter).

*Strephodes Pickthornii* Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, 1852, p. 230, pl. 6, fig. 5.—Lambe, Cruise of the "Arctic" in 1908-9, 1910, p. 480.

*Cyathophyllum pickthorni* Miller, N. A. Geol. Pal., 1889, p. 182, (gen. ref.).

Niagaran: Cape Riley and Beechey. Griffith's and Cornwallis Islands, Arctic America.

**Cyathophyllum plicatum** Goldfuss.

Not recognized.

*Cyathophyllum plicatum* Goldfuss, Petrefacta, 1826, p. 54, pl. 15, fig. 12; 2d ed., 1862, pt. 1, p. 51.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 61.—Sherzer,

Bull. Geol. Soc. Amer., 3, 1892, p. 254.

Silurian? (Devonian): Kentucky.

**Cyathophyllum plicatulum** Castelnau.

Not recognized.

*Cyathophyllum plicatulum* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 4.

Silurian: Drummond Island, Lake Huron.

**CYATHOPHYLLUM PROFUNDUM** Conrad. See *Streptelasma (Petraia) profundum*.

- Cyathophyllum* (*Calophyllum*) *pustulatum* Conrad. Not recognized.  
*Cyathophyllum* (*Calophyllum*) *pustulatum* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 3, 1846, p. 22, pl. 1, fig. 24.  
 Silurian: Ohio.
- Cyathophyllum radiclea* Rominger.**  
*Cyathophyllum radiclea* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 109, pl. 39, fig. 3.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 86, figs. 1-6.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 202, pl. 19, figs. 12-17.  
 Niagaran: Drummond Island and Point Detour, Michigan; Masonville, Iowa; Louisville, Kentucky, and vicinity.  
 Helderbergian (probably Keyser): Near Cumberland, Maryland.
- Cyathophyllum rollinii* Castelnau. Not recognized.  
*Cyathophyllum Rollinii* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 49, pl. 22, fig. 5.  
 Silurian: Drummond Island, Lake Huron.
- Cyathophyllum schucherti* Swartz.**  
*Cyathophyllum schucherti* Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 203, pl. 20, figs. 5-9.  
 Helderbergian (Keyser): Pinto, Cash Valley, etc., Maryland; Hyndman, Pennsylvania.
- Cyathophyllum sedentarium* Foerste.**  
*Cyathophyllum sedentarium* Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 315, pl. 6, figs. 3a-c.  
 Clinton (Waco): Near Estill Springs, Panola, and Waco, Kentucky.
- CYATHOPHYLLUM SHUMARDI* Edwards and Haime. See *Amplexus shumardi*.
- Cyathophyllum solitarium* Billings.**  
*Cyathophyllum solitarium* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 93.  
 Niagaran: Portage Bay, Manitoulin Islands, Lake Huron.
- Cyathophyllum striatulum* Castelnau. Not recognized.  
*Cyathophyllum striatulum* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 1.  
 Silurian (?): Banks of Lakes Huron and Erie.
- CYATHOPHYLLUM TETRAGONUM* Quenstedt. See *Goniophyllum pyramidale*.
- Cyathophyllum thoroldense* Lambe.**  
*Cyathophyllum Thoroldense* Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 147, pl. 11, figs. 5, 5a, b.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 96, pl. 16, fig. 16.  
 Niagaran (Lockport): Thorold and St. Catharines, Ontario.  
 Upper Monroan (Anderdon): Detroit, Michigan.
- Cyathophyllum turbinatum* Owen. Not recognized.  
*Cyathophyllum turbinatum* Owen (not Goldfuss), Geol. Expl. Iowa, Wisconsin and Illinois, 2d ed., 1844, p. 78, pl. 14, fig. 6.  
 Niagaran: Iowa and Wisconsin.
- CYATHOPHYLLUM UNDATUM ET MULTIPLICATUM* Owen. See *Ptychophyllum expansum*.



**Cyathophyllum vesiculosum** Owen.

Not recognized.

*Cyathophyllum vesiculosum* Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 78, pl. 14, fig. 8.

Niagaran: Iowa and Wisconsin.

**Cyathophyllum vicinum** Castelnau.

Not recognized.

*Cyathophyllum vicinum* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 6.

Silurian(?): Northern New York.

**Cyathophyllum wahlenbergi** Billings.

*Cyathophyllum Wahlenbergii* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 108 (adv. sheets, 1862); Cat. Sil. Foss., Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 136, pl. 11, figs. 2, 2a, b.

Anticostian (Becsie River-Gun River): East Point, Anticosti.

**CYATHOSPONGIA** Dawson. See *Cyathophycus* Walcott.

**CYATHOSPONGIA** Hall.Genotype: *C. excrescens* Hall.

*Cyathospongia* Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 15), 1884, p. 419.—Miller, N. A. Geol. Pal., 1889, p. 158.

**Cyathospongia excrescens** Hall.

*Cyathospongia excrescens* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884 (ext. 1882, p. 15), p. 419.

Niagaran: Falls of the Ohio, and Perry County, Tennessee.

**CYATHOSPONGIA QUEBECENSIS** Dawson and Hinde. See *Cyathophycus quebecensis*.

**CYBELE ELLA** Raymond and Narraway. See *Cybeloides ella*.

**CYBELE MIRUS** Clarke. See *Cybeloides mirus*.

**CYBELE PRIMA** Raymond. See *Cybeloides primus*.

**CYBELE PUNCTATA** Hall. See *Encrinurus ornatus*.

**CYBELE VALCOURSIS** Raymond. See *Cybeloides primus*.

**CYBELE VIGILANS** Hall. See *Encrinurus vigilans*.

**CYBELE WINCHELLI** Clarke. See *Cybeloides winchelli*.

**CYBELOIDES** Slocum.Genotype: *C. iowensis* Slocum.

*Cybeloides* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 63.

**Cybeloides ella** (Raymond and Narraway).

*Cybele ella* Raymond and Narraway, Annals Carnegie Mus., 3, 1906, p. 598, fig. 1.

*Cybeloides ella* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 64.

Black River: Petite Chaudiere, near Ottawa, Ontario.

**Cybeloides iowensis** Slocum.

*Cybeloides iowensis* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 64, pl. 16, figs. 1-4.

Richmond (Maquoketa): Elgin and Bloomfield, Iowa.

**Cybeloides mirus** (Billings).

*Encrinurus mirus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 292, fig. 282.

*Cryptonymus mirus* Vogdes, Mon. Genera Zethus, etc., 1878, p. 34.

**Cybeloides mirus**—Continued.

*Cybele mirus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 743.

Chazyan (Quebec—N, P): Table Head, Pistolet Bay, and Portland Creek, Newfoundland.

**Cybeloides primus** (Raymond).

*Glaphurus primus* Raymond, Ann. Carnegie Mus., 3, 1905, p. 362, pl. 14, figs. 7, 8.

*Cybeloides prima* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 64.

*Cybele valcourensis* Raymond, Ann. Carnegie Mus., 3, 1905, p. 362, pl. 14, fig. 9.

*Cybele prima* Raymond and Carraway, Ann. Carnegie Mus., 3, 1906, p. 601.—Raymond, *ibid.*, 7, 1910, p. 75, pl. 19, fig. 19; 7th Rep. State Geol. Vermont, 1910, p. 237, pl. 36, figs. 7–9; pl. 39, fig. 19.

Chazyan (Day Point, Crown Point): Valcour Island, New York.

**Cybeloides? winchelli** (Clarke).

*Cybele winchelli* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 742, fig. 59.

*Cybeloides? winchelli* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 64.

Trenton (Prosser): Fillmore County, Minnesota.

**CYCLASTER** Billings. See *Edrioaster* Billings.

**CYCLENDOCERAS** Grabau and Shimer. See *Endoceras* Hall.

**CYCLOCERAS** McCoy.

Genotype: *Orthoceras annulare* Fleming.

*Cycloceras* McCoy, Synop. Carb. Foss. Ireland, 1844, p. 10.—Saemann, *Palaeontographica*, 3, 1852, p. 162.—McCoy, *British Pal. Rocks Foss.*, 1854, p. 318.—Barrande, *Syst. Sil. Centre Boheme*, 2, pt. 3, 1874, p. 770.—Hyatt, *Proc. Boston Soc. Nat. Hist.*, 22, 1884, p. 275; *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 518.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 57.—Hyatt, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 599.

*Heloceras* Barrande, *Syst. Sil. Centre Boheme*, 2, pt. 3, 1874, p. 773.

**Cycloceras amycus** (Hall).

*Orthoceras amycus* Hall, 11th Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 324, pl. 33, figs. 3, 4; *Trans. Albany Inst.*, 10, 1883, p. 74.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 541, figs.

*Orthoceras (Cycloceras) amycus* Foerste, *Geol. Surv. Ohio, Pal.*, 7, 1893, p. 546, pl. 33, fig. 5.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

Upper Medinan (Brassfield): Dayton, Ohio.

**Cycloceras crocus** (Billings).

*Orthoceras perannulatum* Billings (not Portlock, 1843), *Geol. Surv. Canada, Rep. Progr. for 1853–56*, 1857, p. 319.

*Orthoceras Crocus* Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 22.

Richmond (English Head) and Gamachian: West End, etc., Anticosti.

**Cycloceras inceptum** (Foerste).

*Orthoceras inceptum* Foerste, *Bull. Sci. Lab. Denison Univ.*, 1, 1885, p. 117, pl. 13, figs. 1a–c; *Proc. Boston Soc. Nat. Hist.*, 24, 1889, p. 286.

*Orthoceras (Cycloceras) inceptum* Foerste, *Geol. Surv. Ohio, Pal.*, 7, 1893, p. 543, pl. 25, figs. 1a–c.

Upper Medinan (Brassfield): Todds Fork near Wilmington and Dayton, Ohio.



**Cycloceras inceptum acceleratum** (Foerste).

*Orthoceras inceptum* var. *acceleratum* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 545, pl. 37A, fig. 10.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

**Cycloceras lesueuri** (Clarke).

*Orthoceras lesueuri* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 785, pl. 53, fig. 4; pl. 55, figs. 8, 9.

*Cycloceras lesueuri* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 57, fig. 1256.

Black River (Platteville): Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 46528, U.S.N.M.

**Cycloceras nicolleti** (Clarke).

*Orthoceras nicolleti* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 784, pl. 55, figs. 1-2.

*Cycloceras nicolleti* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58, fig. 1258.

Black River (Platteville): Belle Creek, Minnesota.

**Cycloceras novacarlislense** (Foerste).

*Orthoceras* (*Cycloceras*) *novacarlislensis* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 281, pl. 5, fig. 25; pl. 8, fig. 1; Geol. Surv. Ohio, Pal., 7, 1893, p. 545, pl. 30, fig. 25; pl. 33, fig. 1.

Upper Medinan (Brassfield): Brown's Quarry, near New Carlisle, Ohio.

**Cycloceras olorus** (Hall).

*Orthoceras vertebrale* Hall (not Schlotheim), Pal. New York, 1, 1847, p. 201, pl. 43, figs. 5a-c.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 328.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 608.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 4.—Hitchcock, Geol. Vermont, 1, 1861, p. 298, fig. 208.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 158, fig.

*Orthoceras olorus* Hall in Miller's American Pal. Foss., 1877, p. 245.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 554, fig.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 788, pl. 55, figs. 3, 5.

*Cycloceras olorus* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 57, fig. 1257. Trenton: Middleville, etc., New York; Wykoff, etc., Minnesota (Prosser).

Black River (Platteville): Mineral Point and Janesville, Wisconsin; St. Charles and Holden, Minnesota.

**Cycloceras olorus baffinense** (Schuchert).

*Orthoceras olorus* var. *baffinensis* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 169, pl. 12, figs. 19-22.

Mohawkian: Head of Frobisher Bay, Baffin Land.

*Cotypes*.—Cat. No. 28192, U.S.N.M.

**Cycloceras perroti** (Clarke).

*Orthoceras perroti* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 785, pl. 54, figs. 4, 5. Richmond (Maquoketa): Granger, Minnesota.

**Cycloceras? rectiannulatum** (Hall).

*Orthoceras rectiannulatum* Hall, Pal. New York, 1, 1847, p. 34, pl. 7, figs. 2, 2a.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 149.

*Cycloceras?* (*Spyroceras?*) *rectiannulatum* Ruedemann, Bull. New York State Mus., 90, 1906, p. 506.

Chazy: Clinton County, New York.

**Cycloceras teretiforme** (Hall).

Orthoceras teretiforme Hall, Pal. New York, 1, 1847, p. 198, pl. 42, figs. 8a, b.—  
Emmons, Amer. Geology, 1, pt. 2, 1855, p. 149.

Orthoceras (Cycloceras) teretiforme Clarke and Ruedemann, Bull. New York State  
Mus., 65, 1903, p. 642 (gen. ref.).

Trenton: Watertown, New York.

CYCLOCCELIA Foerste. See Plectorthis, subgenus Encyclodema Foerste.

**CYCLOCONCHA** Miller.

Genotype: *C. mediocardinalis* Miller.

Anodontopsis (part) Meek (not McCoy), Amer. Jour. Sci. Arts, 3d ser., 2, 1871,  
p. 297; Pal. Ohio, 1, 1873, p. 140.

Cycloconcha Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 231.—Ulrich, Geol.  
Surv. Ohio, 7, 1893, p. 686.—Zittel, Handb. Pal., 2, 1881, p. 103.—Miller,  
N. A. Geol. Pal., 1889, p. 474.

Orthodontiscus Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 140.—Cumings, 32d Ann.  
Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 983.

Observation.—See Ulrich (1893) for a discussion of the name Orthodontiscus.

**Cycloconcha mediocardinalis** Miller.

Cycloconcha mediocardinalis Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 231,  
figs. 21, 22; N. A. Geol. Pal., 1889, p. 474, fig. 809.—Ulrich, Geol. Surv. Ohio,  
7, 1893, p. 686, pl. 48, fig. 12; pl. 51, figs. 14–21.

Eden (Southgate): Cincinnati, Ohio, and vicinity.

*Plesiotype*.—Cat. No. 46161, U.S.N.M.

**Cycloconcha milleri** (Meek).

Anodontopsis? *Milleri* Meek, Amer. Jour. Sci., 3d ser., 2, 1871, p. 297; Geol. Surv.  
Ohio, Pal., 1, 1873, p. 140, pl. 12, figs. 1a–d.—Miller, Cincinnati Quart. Jour.  
Sci., 1, 1874, p. 227; N. A. Geol. Pal., 1889, p. 462, fig. 775.

Cycloconcha milleri Ulrich, Geol. Surv. Ohio, 7, 1893, p. 686 (gen. ref.).

Orthodontiscus milleri Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana,  
1908, p. 1015, pl. 47, figs. 8, 8c.

Richmond (Waynesville): Versailles, Indiana.

*Cotypes* and *plesiotypes*.—Cat. Nos. 26409, 46162, U.S.N.M.

**Cycloconcha oblonga** Foerste.

Cycloconcha oblonga Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 137,  
pl. 1, fig. 6.

Trenton (Upper): Near Rogers Gap, Kentucky.

**Cycloconcha ovata** Ulrich.

Cycloconcha ovata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 687, pl. 48, figs. 13–15.

Eden (Southgate): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 46163, U.S.N.M.

**CYCLOCRINITES** Eichwald.

Genotype: *C. spaskii* Eichwald.

Cyclocrinites Eichwald, Schicht. Esthland, 1840, p. 192.—Edwards and Haime,  
Mon. Polyp. Foss. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 177,  
468.—Eichwald, Leth. Ross. Pal. Russie, 1, 1860, p. 637.—Milne-Edwards,  
Hist. Nat. d. Corall., 3, 1860, p. 452.—Niles, Proc. Boston Soc. Nat. Hist., 10,  
1855, p. 19.

Cyclocrinus Kayser, Zeits. d. d. geol. Gesell., 27, 1875, p. 780.—Nicholson and  
Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, pp. 15, 16.—Roemer, Leth.  
geog., 1 Theil, Leth. Pal., Erste Lief, 1880, p. 292.—Zittel, Handb. Pal., 1,  
1880, p. 728.—Rauff, Zeits. d. d. geol. Gesell., 40, 1888, p. 609.—Roemer,



**CYCLOCORINITES**—Continued.

Neues Jahrb. f. Min., Geol. Pal., 1, 1888, p. 74.—Stolley, Archiv. f. Anthropol. Geol. Schleswig-Holsteins, 1, Heft, 2, 1896, pp. 189, 276.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 77.

Observation.—See *Pasceolus* for a probable synonym.

**Cyclocrinites spaskii** Eichwald.

*Cyclocrinites spaskii* Eichwald, Ueber Silur. Schicht. Esthland, 1840, p. 192 (German ed.), p. 204 (French ed.); *Urwelt von Russland*, Heft 2, 1842, p. 32, pl. 1, fig. 8; *Leth. Ross. Pal. Russie*, 1, 1860, p. 638, pl. 32, figs. 21a-d.

*Cyclocrinus spaskii* Eichwald, Bull. Soc. Imp. Nat. Moscou, 29, 1856, p. 124.

Middle Ordovician: Esthonia, Russia. Doubtfully identified in the Appalachian Valley.

**CYCLOCORINUS** Kayser. See *Cyclocrinites* Eichwald.

**CYCLOCORINUS CLAUDII** Stolley. See *Pasceolus claudii*.

**CYCLOCORINUS DACTYLOIDES** Stolley. See *Cerionites dactyloides*.

**CYCLOCORINUS DARWINII** Stolley. See *Pasceolus darwini*.

**CYCLOCORINUS GLOBOSUS** Stolley. See *Pasceolus plobosus*.

**CYCLOCORINUS GREGARIUS** Stolley. See *Nidulites gregarius*.

**CYCLOCORINUS HALLI** Stolley. See *Pasceolus halli*.

**CYCLOCORINUS INTERMEDIUS** Stolley. See *Nidulites intermedius*.

**CYCLOCORINUS SPASKII** Eichwald. See *Cyclocrinites spaskii*.

**CYCLOCYSTOIDES** Billings and Salter.

Genotype: *C. halli* Billings.

*Cyclocystoides* Billings and Salter, Geol. Surv. Canada, dec. 3, 1858, p. 86.—

Hall, Descrip. new spec. Crin., 1866, p. 10; 24th Rep. New York State Cab.

Nat. Hist., 1872, p. 217.—Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist.,

1, 1878, p. 34.—Miller, N. A. Geol. Pal., 1889, p. 237.—Bather, Treatise on

Zool., pt. 3, Echinoderma, London, 1900, p. 210, fig. 8.—Raymond, Bull.

Victoria Mem. Mus., 1, 1913, p. 25.

**Cyclocystoides anteceptus** Hall.

*Cyclocystoides anteceptus* Hall, Desc. new spec. Crin., etc., 1866, p. 12; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 219.

Black River: Escanaba River, Michigan.

**Cyclocystoides bellulus** Miller and Dyer.

*Cyclocystoides bellulus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 34, pl. 2, figs. 10, 10a.

Maysville (Fairmount): Cincinnati, Ohio.

**Cyclocystoides cincinnatiensis** Miller and Faber.

*Cyclocystoides cincinnatiensis* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 84, pl. 1, figs. 7, 8.

Maysville (Corryville): Cincinnati, Ohio.

**Cyclocystoides halli** Billings.

*Cyclocystoides Halli* Billings, Geol. Surv. Canada, dec. 3, 1858, p. 86, pl. 10 bis, figs. 1-7.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).—

Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 25, pl. 3, figs. 1, 3, 4.

Trenton (Curdsville): Ottawa, Kirkfield, Hull, and Lake St. John, Canada.

**Cyclocystoides huronensis** Billings.

*Cyclocystoides Huronensis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 393, fig. 369.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 29, pl. 3. fig. 2.  
Richmond: Rabbit Island, Lake Huron.

**Cyclocystoides illinoisensis** Miller and Gurley.

*Cyclocystoides illinoisensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 61, pl. 5, figs. 27, 28.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 40, pl. 1, fig. 2.  
Upper Medinan (Girardeau): Orchard Creek, Alexander County, Illinois.

**Cyclocystoides magnus** Miller and Dyer.

*Cyclocystoides magnus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 32, pl. 2, figs. 8, 8a.—Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 70, pl. 1, figs. 2, 2a; N. A. Geol. Pal., 1889, p. 237.  
*Cyclocystoides* sp. (?*C. magnus*) Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 85, pl. 1, figs. 13-15.  
Richmond (Waynesville): Near Morrow and Waynesville, Ohio.  
?Maysville: Cincinnati, Ohio.  
*Plesiotype*.—Cat. No. 40733, U.S.N.M.

**Cyclocystoides minus** Miller and Dyer.

*Cyclocystoides minus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 33, pl. 2, fig. 5.  
Richmond: Morrow, Ohio.

**Cyclocystoides mundulus** Miller and Dyer.

*Cyclocystoides mundulus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 34, pl. 2, fig. 7.  
Richmond: Morrow, Ohio.

**Cyclocystoides nitidus** Faber.

*Cyclocystoides nitidus* Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 17, pl. 1, fig. 1.  
Maysville (Corryville): Near Transit, Ohio.

**Cyclocystoides parvus** Miller and Dyer.

*Cyclocystoides parvus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 33, pl. 2, fig. 6.  
Richmond: Morrow, Ohio.

**Cyclocystoides salteri** Hall.

*Cyclocystoides salteri* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 218, pl. 6, fig. 16 (adv. sheets, 1871).—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 211, fig. 8.  
Trenton: Near Saratoga, New York.

**CYCLOGNATHUS** Linnarsson.

Genotype: *C. micropygus* Linnarsson.

*Cyclognathus* Linnarsson, Geol. Foren. Stockholm Forh., 2, No. 12, 1875, p. 500.—Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 109.—Zittel, Handb. d. Pal., 2, 1885, p. 596.—Koken, Die Leitfossilien, Leipzig, 1896, p. 19.

**Cyclognathus rotundifrons** Matthew.

*Cyclognathus rotundifrons* Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 107, pl. 7, figs. 16a, b.  
Canadian (Bretonian—Div. C3d): St. John, New Brunswick.



**CYCLOGRAPTUS** Spencer.Genotype: *C. rotadentatus* Spencer.

*Cyclograptus* Spencer, Proc. Amer. Assoc. Adv. Sci., 31, 1883, p. 365; Bull. Mus. Univ. State Missouri, 1, 1884, p. 42; Trans. Acad. Sci. St. Louis, 4, 1884, p. 563, 592.—Miller, N. A. Geol. Pal., 1889, p. 182.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 182.

**Cyclograptus rotadentatus** Spencer.

*Cyclograptus rotadentatus* Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 592, pl. 6, figs. 6, 6a; Bull. Mus. Univ. State Missouri, 1, 1884, No. 1, p. 42, pl. 6, figs. 6, 6a.—Miller, N. A. Geol. Pal., 1889, p. 182, fig. 162.—Gurley, Jour. Geol., 4, 1896, pp. 94, 309.—Ruedemann, Mem. New York State Mus., 11, 1908, p. 184, pl. 2, fig. 5, figs. 91, 92.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 45, 46, figs. 57, 58.

Niagaran dolomite: Hamilton, Ontario.

Clinton (Rochester): Clinton, New York.

**CYCOLITES ROTULOIDES** Hall. See *Palæocyclus rotuloides*.

**CYCOLITUITES** Remele.Genotype: *C. applanatus* Remele.

*Cyclolituities* Remeles Zeits. d. d. geol. Gesell., 38, 1886, p. 467.—Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 505.

**Cyclolituities americanus** Hyatt.

*Cyclolituities americanus* Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 505.

Canadian (Quebec): Gargamelle Cove, Newfoundland.

**CYCLONEMA** Hall.Genotype: *Pleurotomaria bilix* Conrad.

*Cyclonema* Hall, Pal. New York, 2, 1853, p. 89.—Salter, Geol. Surv. Canada, Can. Org. Rem., dec. 1, 1859, pp. 23, 25.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 319.—Zittel, Handb. Pal., 2, 1882, p. 187.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 187.—Miller, N. A. Geol. Pal., 1889, p. 400.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, p. 427.—Koken, Die Leitfossilien, Leipzig, 1896, p. 120, fig. 101.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1056.—Koken, Bull. Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 191; Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 24.—Pilsbry, Zittel-Eastman Textb. Pal., 1, 1900, p. 448.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 668.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 530.

**CYCLONEMA** (part) of Hall, Salter and others. See *Trochonema* Salter.

**Cyclonema bellulum** Billings.

*Cyclonema bellula* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55.

Anticostian (Gun River): The Jumpers, Anticosti.

**CYCLONEMA BILEX** Foerste. See *Cyclonema daytonense*.

**CYCLONEMA BILEX** (part) Hall. See *Cyclonema mediale*.

**CYCLONEMA BILEX** var. *CONICA* Miller. See *Cyclonema bilix*.

**CYCLONEMA BILEX** var. *LATA* Meek. See *Cyclonema bilix*.

**Cyclonema bilix** (Conrad).

*Pleurotomaria bilix* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 271, pl. 16, fig. 10.—Hall (part), Pal. New York, 1, 1847, p. 305, pl. 83, figs. 4a-e.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 820, fig. 620.

**Cyclonema bilix**—Continued.

*Turbo bilix* D'Orbigny, Prod. de Pal., 1, 1849, p. 5 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158.

*Cyclonema* (*Pleurotomaria*) *bilix* Zittel, Handb. Pal., 2, 1882, p. 188, fig. 234.

*Cyclonema bilix* Hall, Pal. New York, 2, 1852, p. 89 (gen. ref.); 14th Rep. New York State Cab. Nat. Hist., 1861, p. 92.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 217, fig. 225.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 8, fig. 3.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 319.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1889, p. 492, pl. 2, figs. 3, 4, 5.—Ulrich, Amer. Geol., 1, 1888, p. 188, footnote.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 172, fig.—Miller, N. A. Geol. Pal., 1889, p. 400, fig. 663.—Keyes, Missouri Geol. Surv., 5, 1894, p. 154.—Koken, Bull. Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 191, fig. 34.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1058, pl. 58, figs. 35–39.

*Cyclonema bilix* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 958, pl. 40, figs. 2–2d.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 668, figs. 925 a, b.

*Cyclonema bilix lata* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 152, pl. 13, figs. 5e, 5f.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 320.

*Cyclonema bilix conica* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 320.

Richmond (Arnheim-Whitewater): Richmond, etc., Indiana; Ohio; Kentucky; etc.

*Plesiotype*.—Cat. Nos. 45763–45765, U.S.N.M. (Ulrich and Scofield).

**Cyclonema bilix fluctuatum** (James).

*Cyclonema fluctuata* James, Cat. L. Sil. Foss. Cincinnati Group, 1871, p. 8 (nom. nud.); Cincinnati Quart. Jour. Sci., 1, 1874, p. 152.

*Cyclonema bilix* var. *fluctuatum* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1058, pl. 78, figs. 40–42.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 959, pl. 40, figs. 3–3b.

Richmond (Arnheim, Waynesville): Warren and Clinton Counties, Ohio; Indiana; Tennessee.

*Plesiotype*.—Cat. No. 45767, U.S.N.M.

**CYCLONEMA CANCELLATUM** Hall. See *Strophostylus cancellatus*.

**CYCLONEMA CINCINNATIENSE** Miller. See *Cyclonema varicosum*.

**Cyclonema commune** Billings.

*Cyclonema communis* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55.

Anticostian (Jupiter River, Chicotte): The Jumpers, Anticosti.

**Cyclonema cushingi** Ruedemann.

*Cyclonema cushingi* Ruedemann, Bull. New York State Mus., 162, 1912, pl. 7, figs. 8–10.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

**Cyclonema daytonense** Foerste.

*Cyclonema bilix* Foerste (not Conrad), Bull. Sci. Lab. Denison Univ., 1, 1885, p. 94; Proc. Boston Soc. Nat. Hist., 24, 1889, p. 290, pl. 5, fig. 15; Geol. Surv. Ohio, Pal., 7, p. 551, pl. 26, fig. 15, var. p. 130, fig. 15.

*Cyclonema daytonensis* Foerste, 24th Ann. Rep. Indiana Geol. Nat. Hist. Surv., 1899, p. 77; Jour. Geol., 11, 1903, p. 707.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 100, pl. 6, fig. 4; pl. 7, fig. 21.

Upper Medinan: Dayton and Todds Fork, Ohio (Brassfield); Thebes, Illinois; and Edgewood, Missouri (Edgewood).



**Cyclonema decorum** Billings.

*Cyclonema decora* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 56.

Anticostian (Chicotte): Southwest Point, Anticosti.

**CYCLONEMA ELEVATA** Hall. See *Strophostylus elevatus*.

**CYCLONEMA FLUCTUATA** James. See *Cyclonema bilix fluctuatum*.

**Cyclonema gracile** Ulrich.

*Cyclonema gracile* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 82, figs. 55-61.

Maysville (Mt. Hope): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. Nos. 45768, 45769, U.S.N.M.

**Cyclonema gracile striatulum** Ulrich.

*Cyclonema gracile* var. *striatulum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 82, figs. 59-61 (*striatellum* on plate).

Maysville (Mt. Hope): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 45770, U.S.N.M.

**Cyclonema hageri** Billings.

*Cyclonema Hageri* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 178, fig. 169; Pal. Fossils, 1, Geol. Surv. Canada, 1863, p. 29, fig. 27 (adv. sheets 1862).—Miller, N. A. Geol. Pal., 1889, p. 401, fig. 664.

Trenton: Smith's Quarries, Montreal, Quebec.

**Cyclonema hallianum** Salter.

*Cyclonema Halliana* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 26, pl. 6, fig. 1.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 178, fig. 168.—Miller, N. A. Geol. Pal., 1889, p. 401, fig. 665.

Black River (Leray): Pauquette's Rapids, Ottawa River, Canada.

**Cyclonema humerosum** Ulrich.

*Cyclonema humerosum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1061, pl. 78, figs. 43-46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1903, p. 960, pl. 40, figs. 5-5c.

Maysville (McMillan) and Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee.

*Cotypes*.—Cat. Nos. 45771, 45772, U.S.N.M.

**CYCLONEMA HUMILIS** Billings. See *Diaphorostoma humile*.

**Cyclonema inflatum** Ulrich.

*Cyclonema inflatum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1060, pl. 78, figs. 31, 32.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 45773, U.S.N.M.

**Cyclonema (?Holoepa) limatum** Ulrich.

*Cyclonema (?Holoepa) limatum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1063, pl. 82, figs. 62-64.

Maysville (Fairmount): Cincinnati, Ohio.

*Cotypes*.—Cat. No. 45774, U.S.N.M.

**Cyclonema mediale** Ulrich.

*Cyclonema bilix* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 151, pl. 13, figs. 5a, c, d (not g).

**Cyclonema mediale**—Continued.

*Cyclonema mediale*, Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1059, pl. 78, figs. 29, 30.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 960, pl. 40, figs. 4, 4a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 669, fig. 925c, d.

Maysville (Fairmount): Cincinnati, Ohio; Kentucky and Indiana.

*Cotypes*.—Cat. No. 45775, U.S.N.M.

**CYCLONEMA MEDIOCRIS** Billings. See *Holopea mediocris*.

*Cyclonema?* minor James.

Not recognized.

*Cyclonema?* minor James, The Paleontologist, No. 1, 1878, p. 6.

Maysville: Cincinnati, Ohio.

**Cyclonema montrealense** Billings.

*Cyclonema Montrealensis* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 30, text fig. 28. (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 178, fig. 170.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 186, pl. 12, fig. 33.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 110, pl. 7, fig. 7.

Trenton: Island of Montreal, Canada; Snake Hill, Saratoga County, New York (Snake Hill); New Jersey.

**CYCLONEMA?** NORMALIANA Raymond. See *Gyronema historicum*.

**CYCLONEMA?** OBSOLETA Hall. See *Holopea obsoleta*.

**CYCLONEMA** PERCARINATA of authors. See *Gyronema percarinatum*.

**Cyclonema percingulatum** Billings.

*Cyclonema percingulata* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1859, p. 304; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55 (loc. ref.).

Anticostian (Jupiter River): Southwest Point, Anticosti.

**CYCLONEMA** PERVETUSTA Whitfield and Hovey. See *Euconia?* pervetusta.

**Cyclonema phædra** Billings.

*Cyclonema Phædra* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 188.

Canadian (Beekmantown): Near St. Antoine above Quebec, Canada

**Cyclonema** (?*Gyronema*) **præcipitum** Ulrich.

*Cyclonema* (?*Gyronema*) *præcipitum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pl. 78, fig. 26.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Holotype*.—Cat. No. 46052, U.S.N.M.

**Cyclonema pyramidatum** James.

*Cyclonema pyramidata* James, Cat. L. Sil. Fossils Cincinnati Group, 1871, p. 8; Cincinnati Quart. Jour. Sci., 1, 1874, p. 152.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1061, pl. 78, figs. 33, 34.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Plesiotype*.—Cat. No. 45776, U.S.N.M.

**CYCLONEMA** RUGÆLINEATA Nettelroth. See *Poleumita rugilineata*.

**CYCLONEMA** SEMICARINATA Salter. See *Gyronema semicarinatum*.



**Cyclonema simulans** Ulrich.

*Cyclonema simulans* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1061, pl. 78, fig. 47.

Maysville (Corryville): Cincinnati, Ohio.

*Holotype*.—Cat. No. 45777, U.S.N.M.

**Cyclonema sublaeve** Ulrich.

*Cyclonema sublaeve* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 78, figs. 48, 49.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 669, fig. 925j.

Maysville (Mt. Hope): Cincinnati, Ohio, and vicinity

*Cotypes*.—Cat. No. 45778, U.S.N.M.

**CYCLONEMA SULCATA** Billings. See *Poleumita? sulcata*.

**CYCLONEMA TENNESSEENSE** Miller. See *Strophostylus tennesseensis*.

**CYCLONEMA TEXTILE** Miller. See *Strophostylus textilis*.

**Cyclonema thalia** Billings.

*Pleurotomaria Thalia* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 303.

*Cyclonema Thalia* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 17, fig. 5; p. 55.

Richmond (Charleton): Charleton Point, Anticosti.

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

**Cyclonema transversum** Ulrich.

*Cyclonema transversum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 82, figs. 65-67.

Maysville (Fairmount): Covington, Kentucky, and vicinity.

*Cotypes*.—Cat. Nos. 45779, 45780, U.S.N.M.

**Cyclonema varians** Billings.

*Cyclonema varians* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 305; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55 (loc. ref.).

Anticostian (Chicotte): Southwest Point, Anticosti.

**Cyclonema varicosum** Hall.

*Cyclonema varicosa* Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 91, 110; Desc. N. Sp. Foss. Cincinnati Group, 1871, pl. 4, figs. 1-3; 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 8, figs. 1, 2.—Meek, Geol. Surv. Ohio, 1, 1873, p. 152.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 321.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1060, pl. 78, figs. 27, 28.—Hayes and Ulrich, U. S. Geol. Surv. Folio 95, illust. sheet, 1903, figs. 28, 29.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 669, fig. 925h-i.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, p. 184, fig. 21.

*Cyclonema ventricosa* (in error for *varicosa*) Hall, 24th Rep. New York State Mus. Nat. Hist., 1870, pl. 8.

*Cyclonema cincinnatiense* Miller, Journ. Cincinnati Soc. Nat. Hist., 5, 1882, p. 230, pl. 9, figs. 8, 8a-c.

*Cyclonema varicosum-cincinnatiense* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 139, pl. 1, figs. 12a, b.

Trenton: Nashville, etc., Tennessee (Catheys); Kentucky; Ohio; Minnesota; Virginia.

*Plesiotypes*.—Cat. Nos. 45781, 45782, U.S.N.M.

**CYCLONEMA VARICOSUM-CINCINNATENSE** Foerste. See *Cyclonema varicosum*.

**CYCLONEMA VENTRICOSUM** Hall. See *Cyclonema varicosum* and *Strophostylus ventricosus*.

**CYCLOPORA JAMESII** Prout. See *Escharopora pavonia*.

**CYCLOPORINA** Simpson. See *Semicoscinium* Prout.

**CYCLORA** Hall.

Genotype: *C. minuta* Hall.

*Cyclora* Hall, Amer. Jour. Sci. Arts, 48, 1845, p. 294.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 153.—Miller, Cincinnati Quart. Jour. Sci., 1874, p. 312.—Zittel, Handb. Pal., 2, 1882, p. 193.—Miller, N. A. Geol. Pal., 1889, p. 401.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 673.

***Cyclora alta*** Foerste.

*Cyclora alta* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1855, p. 96, pl. 14 figs. 17a, b; Geol. Surv. Ohio, Pal., 7, 1893, p. 552, pl. 26, figs. 17a, b.  
Upper Medinan (Brassfield): Huffman's Quarry, near Dayton, Ohio.

***Cyclora depressa*** Ulrich.

*Cyclora depressa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 13, pl. 7, figs. 9, 9a.  
Maysville: Hamilton, etc., Ohio; Indiana; Kentucky.  
*Cotypes*.—Cat. No. 45685, U.S.N.M.

***Cyclora hoffmanni*** Miller.

*Cyclora Hoffmanni* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 313, fig. 33; N. A. Geol. Pal., 1889, p. 401, fig. 666.  
Mohawkian and Cincinnati: Cincinnati, Ohio, and many other American localities.

***Cyclora minuta*** Hall.

*Cyclora minuta* Hall, Amer. Jour. Sci. Arts, 48, 1845, p. 294.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 152, pl. 13, figs. 7a-e.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 312.—Whiteaves, Pal. Fossils, Geol. Surv. Canada, 3, pt. 2, 1895, p. 124 (loc. occ.).—Miller, Amer. Geol., 17, 1896, pp. 74-76.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 961, pl. 40, figs. 6-6c.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 673, fig. 932.  
*Holopea nana* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1871, p. 172.  
Mohawkian and Cincinnati: Cincinnati, Ohio, and numerous other American localities.

***Cyclora parvula*** (Hall).

*Turbo? parvulus* Hall, Amer. Jour. Sci. Arts, 48, 1845, p. 294.  
*Cyclora? parvula* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 154.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 313.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 962.  
Mohawkian and Cincinnati: Cincinnati, Ohio, and numerous other American localities.

***Cyclora pulcella*** Miller.

*Cyclora pulcella* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 231, pl. 9, figs. 9, 9a-b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 962, pl. 40, figs. 7-7b.  
Richmond (Arnheim, Waynesville): Versailles, Indiana; Ohio; etc.



**CYCLOSPIRA** Hall and Clarke.Genotype: *Orthis bisulcata* Emmons.

*Cyclospira* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 146.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 469.—Hall and Clarke, 13th Ann. Rep. New York State Geol., 1895, p. 808.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 760.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 410.

**Cyclospira bisulcata** (Emmons).

*Orthis bisulcata* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 396, fig. 4.  
*Atrypa bisulcata* Hall, Pal. New York, 1, 1847, p. 139, pl. 33, fig. 3.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 190, pl. 10, figs. 3a-e.  
 Genus? *bisulcata* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 65.  
*Camarella bisulcata* Miller, Amer. Pal. Foss., 1877, p. 107.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 3, figs.  
*Camarella owatonnaensis* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 328, pl. 4, figs. 1-3.  
*Rhynchonella bisulcata* Safford, Geol. Tennessee, 1869, p. 275, figs. 7, 14.  
*Cyclospira bisulcata*? Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 470, pl. 34, figs. 49-54.  
*Cyclospira bisulcata* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 147, figs. 133-136, pl. 54, figs. 38-40.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 180.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309, figs. 386d-h.  
 Trenton: Adams, Jefferson County, New York; Ottawa, Ontario; Cannon Falls, etc., Minnesota; Lake Winnipeg, Manitoba.

**Cyclospira(?) sparsiplica** Foerste.

*Cyclospira(?) sparsiplica* Foerste, Geol. Ohio, 7, 1895, p. 593, pl. 37A, fig. 18.  
 Upper Medinan (Brassfield): Dayton, Ohio.

**CYCLOSTOMA?** *PERVETUSTA* Conrad. See *Euconia(?) pervetusta*.

**CYCLOSTOMICERAS** Hyatt.Genotype: *Gomphoceras cassinense* Whitfield.

*Cyclostomiceras* Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 530.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 500.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 119.—Hyatt, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 611.

**Cyclostomiceras(?) brevicorne** (Hall).

*Cyrtoceras brevicorne* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 356, pl. 18 (8), figs. 8, 9; rev. ed., 1870, p. 407, pl. 18, figs. 8, 9; pl. 25, fig. 14.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 194, fig.  
*Cyrtoceras brevicorne* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 89, pl. 13, figs. 11, 12.  
*Cyclostomiceras(?) brevicorne* Grabau and Shimer, N. A. Index Fossils, 3, 1910, p. 121, fig. 1361.  
 Niagaran: Racine, Wisconsin (Racine and Guelph); Shelby and Rochester, New York (Guelph).

**Cyclostomiceras cassinense** (Whitfield).

*Gomphoceras cassinense* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 322, pl. 29, figs. 1-3.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 56, fig. 4.  
*Cyclostomiceras cassinense* Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 530.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 501, fig. 56; pl. 37, figs. 1-3; pl. 38, figs. 5, 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 120, fig. 1357.  
 Canadian (Beekmantown): Fort Cassin, Vermont.

**Cyclostomiceras minimum** (Whitfield).

Gomphoceras minimum Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 321, pl. 27, figs. 3-5.

Cyclostomiceras minimum Ruedemann, Bull. New York State Mus., 90, 1906, p. 502, pl. 35, figs. 5-6, fig. 57.

Canadian (Beekmantown): Fort Cassin, Vermont.

**Cyclostomiceras orodes** (Billings).

Cyrtoceras Oroles Billings, Pal. Foss., 1, Geol. Surv. Canada (adv. sheets, 1862), 1865, p. 162.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 103, pl. 14, figs. 7, 7a, 8a, b, 9.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 88, pl. 15, fig. 3-11.

Cyrtoceras (Cyclostomiceras) orodes Grabau, Michigan, Geol. Surv., Geol. Ser., 1, 1909, p. 197, pl. 28, figs. 6, 7; pl. 29, figs. 2, 3.

Cyclostomiceras orodes Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 120, fig. 1358-60.

Niagaran (Guelph): New Hope, Ontario.

Monroan (Amherstburg and Raisin River): Detroit River region.

**CYLICOCRINUS** Miller. See *Barrandeocrinus* Angelin.

**CYLINDROCELIA** Ulrich.

Genotype: *C. endoceroidea* Ulrich.

Cylindrocelia Ulrich, Amer. Geol., 3, 1889, pp. 235, 245.—Miller, N. A. Geol. Pal., 1889, p. 158.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 56.—

Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 77.

**Cylindrocelia covingtonensis** Ulrich.

Cylindrocelia covingtonensis Ulrich, Amer. Geol., 3, 1889, p. 247.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 56.

Maysville (Fairmount): Covington, Kentucky.

*Cotypes*.—Cat. No. 46550, U.S.N.M.

**Cylindrocelia endoceroidea** Ulrich.

Cylindrocelia endoceroidea Ulrich, Amer. Geol., 3, 1889, p. 246, figs. 9, 10.

Black River (Lowville): High Bridge, Kentucky.

**Cylindrocelia minnesotensis** Ulrich.

Cylindrocelia minnesotensis Ulrich, Amer. Geol., 3, 1889, p. 248.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 78, pl. G, figs. 1-3.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

*Cotypes*.—Cat. Nos. 46551, 46552, U.S.N.M.

**Cylindrocelia minor** Ulrich.

Cylindrocelia minor Ulrich, Amer. Geol., 3, 1889, p. 248.

Trenton: Harrodsburg Junction, Kentucky.

**CYLINDROHELIUM** Grabau.

Genotype: *C. profundum* Grabau.

Cylindrohelium Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 102.

**Cylindrohelium heliophylloides** Grabau.

Cylindrohelium heliophylloides Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 103, pl. 10, fig. 7.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

**Cylindrohelium profundum** Grabau.

Cylindrohelium profundum Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 102, pl. 11, figs. 4-6, 7.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan; near Sylvania, Ohio.

Silurian: North Fork of Saskatchewan River, Canada.



**CYMATONOTA Ulrich.**Genotype: *C. typicalis* Ulrich.

*Orthonota* Conrad (part), New York Ann. Geol. Rep., 1841, p. 51.—Hall, 1847, Pal. New York, 1, 1841, p. 299.

*Orthodesma* Hall and Whitfield (part), Pal. Ohio, 2, 1875, p. 93.

*Chænodomus* Ulrich, Geol. Minnesota, 3, pt. 2, 1893, p. 477 (not defined).

*Cymatonota* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 661.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 980.

**Cymatonota attenuata Ulrich.**

*Cymatonota attenuata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 664, pl. 55, figs. 12-14. Richmond (Waynesville); Waynesville, Ohio.

*Cotypes*.—Cat. No. 46164, U.S.N.M.

**Cymatonota constricta Ulrich.**

*Cymatonota constricta* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 664, pl. 55, figs. 10, 11. Richmond (Waynesville); Butler County, Ohio, and Versailles, Indiana.

*Holotype*.—Cat. No. 46165, U.S.N.M.

**Cymatonota cylindrica (Miller and Faber).**

*Orthodesma cylindricum* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 22, pl. 1, figs. 1-4.

Richmond (Waynesville): Warren County, Ohio.

**Cymatonota lenior Foerste.**

*Cymatonota lenior* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 290, pl. 1, fig. 9.

Cincinnati (Pulaski): Riviere des Hurons, near St. Jean Baptiste, Quebec.

**Cymatonota parallela (Hall).**

*Orthonota parallela* Hall, Pal. New York, 1, 1847, p. 299, pl. 82, fig. 7 (not 7a, b, d).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 173, pl. 13, fig. 14.—

(?) Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 216, fig. 224.—

(?) Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 221.

(?) *Orthodesma parallela* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 96.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 565, figs.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, pl. 47, fig. 5.

Cincinnati: Pulaski, Lorraine, etc., New York (Pulaski); Cincinnati, Ohio (Maysville).

**Cymatonota pholadis (Conrad).**

*Pterinea pholadis* Conrad, Amer. Geol. Rep. New York, 1838, p. 118.

*Orthonota pholadis* Hall, Pal. New York, 1, 1847, p. 299, pl. 82, fig. 6.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 174.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 222.

*Cymatonota pholadis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 291, pl. 3, fig. 7.

Cincinnati: Pulaski, etc., New York (Pulaski); (?) Cincinnati, Ohio (Maysville).

**Cymatonota productifrons Ulrich.**

*Cymatonota productifrons* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 665, pl. 55, figs. 17, 18.

*Orthodesma productifrons* Miller, N. A. Geol. Pal., 2d App., 1897, p. 783 (gen. ref.).

Eden (Economy): Covington, Kentucky.

*Holotype*.—Cat. No. 46166, U.S.N.M.



***Cymatonota recta* Ulrich.**

*Cymatonota recta* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 662, pl. 55, figs. 8, 9.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. Nos. 46167, 46178, U.S.N.M.

***Cymatonota semistriata* Ulrich.**

*Cymatonota semistriata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 663, pl. 55, figs. 6, 7.

*Orthodesma semistriatum* Miller, N. A. Geol. Pal., 2d App., 1897, p. 784 (gen. ref.).

Richmond (Waynesville): Clarksville and Waynesville, Ohio.

*Holotype*.—Cat. No. 46169, U.S.N.M.

***Cymatonota typicalis* Ulrich.**

*Chenodorus typicalis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 477, fig. 4 (not defined).

*Cymatonota typicalis* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 662, pl. 55, figs. 1-5.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 998, pl. 45, figs. 1-1c.

Richmond (Waynesville): Waynesville, etc., Ohio; southeastern Indiana.

*Cotypes*.—Cat. No. 46170, U.S.N.M.

**CYPHASPIS Burmeister.**

Genotype: *Phacops ceratophthalma* Goldfuss.

*Cyphaspis* Burmeister, Org. Tril., Ray Soc., 1846, p. 98.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 80, pl. 4, fig. 40.—Barrande, Syst. Sil. du Centre Bohème, 1, 1852, p. 479.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 497.—Nieszkowski, Archiv. f. Naturk. Liv.-Ehst.-u. Kurl., 1, 1857, p. 562.—Alth, Abhandl. der k.-k. Geol. Reichsanstalt, 7, Heft 1, 1874, p. 61.—Ehlert, Bull. Soc. d'Etudes Sci. d'Angers, 1885, p. 3.—Zittel, Handb. Pal., 2, Munich, 1885, p. 624.—Hall and Clarke, Pal. New York, 7, 1888, p. 47, 48, fig.—Clarke, Jour. Morph., 2, 1888, p. 254.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc. 1889, p. 17.—Miller, N. A. Geol. Pal., 1889, p. 541.—Koken, Die Leitfossilien, Leipzig, 1896, p. 24, fig. 15, fig. 5.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 317.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 26.—Grabau and Shimer, N. A. Index Fossils, 2, 1908, p. 302.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 721.

***Cyphaspis arkansanus* Van Ingen.**

*Cyphaspis arkansanus* Van Ingen, School of Mines Quart., 23, 1901, p. 35 (nom. nud.).

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**CYPHASPIS BREVIMARGINATUS Walcott. See *Haploconus brevimarginatus*.*****Cyphaspis christyi* Hall.**

*Cyphaspis christyi* Hall, Trans. Albany Inst., 4, 1864, p. 220; 28th Rep. New York St. Mus. Nat. Hist., doc. ed., 1877, pl. 32, figs. 5-7; Mus. ed., 1879, p. 188, pl. 32, figs. 5-7.—White, 2d Ann. Rep. Dep. State Geol., Indiana, 1880, p. 498, pl. 3, fig. 9.—Hall, 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 333, pl. 34, figs. 5-7.—Miller, N. A. Geol. Pal., 1889, p. 541, fig. 990.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 174, figs.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

**CYPHASPIS CLINTONENSIS Foerste. See *Cyphaspis clintoni*.*****Cyphaspis clintoni* Foerste.**

*Proetus* — Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 92, pl. 8, fig. 5.

*Cyphaspis clintoni* Foerste, Proc. Bost. Soc. Nat. Hist., 24, 1890, p. 272, pl. 6, fig. 22.

**Cyphaspis clintoni**—Continued.

*Cyphaspis clintonensis* Foerste, Geol. Surv. Ohio, 7, 1893, p. 524, pl. 27, fig. 5; pl. 31, fig. 22.

Upper Medinan (Brassfield): Dayton, Ohio; Cumberland Gap, Tennessee.

**Cyphaspis(?) frobisheri** Emerson.

*Cyphaspis? frobisheri* Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 583, fig. 11.

Richmond (Utica?): Frobisher Bay, Baffin Land.

*Plastotype*.—Cat. No. 60627, U.S.N.M.

**CYPHASPIS GALENENSIS** Clarke. See *Haploconus galenensis*.

**Cyphaspis girardeauensis** Shumard.

*Cyphaspis girardeauensis* Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, pt. 2, 1855, p. 197, pl. B, fig. 11 a, b.—Emmons, Man. Geol., 1860, p. 159, fig. 2.—Keyes, Missouri Geol. Surv., 4, 1895, p. 228, pl. 32, fig. 2.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 58, pl. 2, fig. 13.—Miller, N. A. Geol. Pal., 1889, p. 541, fig. 991.

*Calymene spinifera* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 277.

Upper Medinan (Girardeau): Near Cape Girardeau, Missouri.

*Holotype*.—Cat. No. 57102, U.S.N.M.

**CYPHASPIS HUDSONICA** Ruedemann. See *Proetus undulostriatus*.

**Cyphaspis intermedia** Weller.

*Cyphaspis intermedia* Weller, Bull. Chicago Acad. Sci., 4, pt. 2, 1907, p. 231, pl. 20, figs. 3-5.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 121, pl. 7, fig. 26.

Upper Medinan: Near Channahon, Will County (Channahon), and Thebes, Illinois; Edgewood, Missouri (Edgewood).

**Cyphaspis matutina** Ruedemann.

*Cyphaspis matutina* Ruedemann, Bull. New York State Mus., 49, 1901, p. 62, pl. 4, figs. 5-7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 302.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Cyphaspis spinulocervix** Van Ingen.

*Cyphaspis spinulocervix* Van Ingen, School of Mines Quart., 23, 1901, p. 35, (nom. nud.).

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

**Cyphaspis trentonensis** Weller.

*Cyphaspis trentonensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 197, pl. 15, figs. 8-10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 302.

Trenton: Jacksonburg, New Jersey.

**CYPHOCRINUS** Miller.

Genotype: *C. gorbyi* Miller.

*Cyphocrinus* Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 304. (adv. sheets, 1892); N. A. Geol. Pal., 2d App., 1897, p. 741.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 199.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, p. 75, fig. 37 (includes discussion of synonymy).—Zittel, Grundzuge Pal., 1, 1910, p. 161.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 187.

*Hyptiocrinus* Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 138; Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 200.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 145.

**Cyphocrinus chicagoensis** Weller.

*Cyphocrinus chicagoensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 76, pl. 1, figs. 1-4.

Niagaran (Racine): Bridgeport, Illinois.

**Cyphocrinus gorbyi** Miller.

*Cyphocrinus gorbyi* Miller, N. A. Geol. Pal., 1st App., 1892, p. 676, figs. 1221-22; 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 305, pl. 7, figs. 14-16; adv. sheets, 1892, p. 51, pl. 7, figs. 14-16.

*Hyptocrinus typus* Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 138; Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 201, pl. 19, figs. 6 a-c.

Niagaran (Laurel): St. Paul, Shelby County, Indiana.

**CYPHOTRYPA** Ulrich and Bassler. Genotype: *Leptotrypa acervulosa* Ulrich.

*Cyphotrypa* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 29.

**Cyphotrypa acervulosa** (Ulrich).

*Leptotrypa acervulosa* Ulrich, Geol. Minnesota, 3, 1893, p. 318, pl. 27, figs. 24, 25.

*Cyphotrypa acervulosa* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30, pl. 8, figs. 1-3.

Trenton: Decorah, Iowa; Goodhue County, Minnesota (Prosser); Burgin and Frankfort, Kentucky; Ontario.

*Holotype*.—Cat. No. 43189, U.S.N.M.

**Cyphotrypa bulbosa** (Billings).

*Stenopora bulbosa* Billings, Canadian Nat. Geol., 2d ser., 2, 1865, p. 429; Catal. Sil.

Foss. Anticosti, 1866, p. 32.

Gamachian (Ellis Bay): Gamache Bay, etc., Anticosti.

**Cyphotrypa corrugata** (Weller).

*Monotrypa corrugata* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 223, pl. 18, figs. 1-5.

*Cyphotrypa corrugata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 269, pl. 42, figs. 5-9; pl. 44, fig. 4; pl. 52, figs. 1, 2.

Helderbergian: Near Tri States, New York (Decker Ferry); Cash Valley, etc., Maryland (Keyser).

*Plesiotypes*.—Cat. No. 53651, U.S.N.M.

**Cyphotrypa frankfortensis** Ulrich and Bassler.

*Cyphotrypa frankfortensis* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30, pl. 8, figs. 7-9.

Trenton (Cynthiana): Frankfort and Burgin, Kentucky.

*Holotype*.—Cat. No. 43188, U.S.N.M.

**Cyphotrypa informis** (Ulrich).

*Leptotrypa informis* Ulrich, Geol. Minnesota, 3, 1893, p. 317, pl. 27, figs. 22, 23.

*Cyphotrypa informis* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30 (gen. ref.).

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

**Cyphotrypa semipilaris** (Ulrich).

*Leptotrypa semipilaris* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 457, pl. 36, figs. 5-5d.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 181.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 580, fig. 148 (not 149, 150=*Leptotrypa acervulosa*).

*Cyphotrypa semipilaris* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30 (gen. ref.).

Maysville (Fairmount): Covington, Kentucky, and vicinity.

*Cotypes*.—Cat. No. 43395, U.S.N.M.



**Cyphotrypa stidhami** (Ulrich).

*Leptotrypa stidhami* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 456, pl. 36, figs. 4-4b.  
*Monticulipora stidhami* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 76.

*Cyphotrypa stidhami* Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30 (gen. ref.).

Richmond (Whitewater): Brown County, and near Eaton, Ohio.

*Cotypes*.—Cat. No. 43394, U.S.N.M.

**Cyphotrypa wilmingttonensis** Ulrich and Bassler.

*Cyphotrypa wilmingttonensis* Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 31, pl. 8, figs. 4-6.

Richmond (Fernvale): Wilmington, Illinois.

*Holotype*.—Cat. No. 43192, U.S.N.M.

**CYPRICARDIA ALATA** Hall. See *Modiolopsis primigenia*.

**CYPRICARDIA AMERICANA** Emmons. See *Goniophora carinata*.

**CYPRICARDIA?** *ANGUSTA* Hall. See *Ctenodonta machæriiformis*.

**CYPRICARDIA MODIOLARIS** Owen. See *Modiolopsis modiolaris*.

**CYPRICARDIA OBSOLETA** Hall. See *Modiolopsis subalatus*.

**CYPRICARDIA ORTHONOTA** Hall. See *Modiolopsis orthonota*.

**CYPRICARDIA SUBTRUNCATA** Emmons. See *Whitella subtruncata*.

**CYPRICARDINIA** Hall.

Genotype: *C. lamellosa* Hall.

*Cypricardinia* Hall, Pal. New York, 3, 1859, p. 266; Prelim. Notice Lam., pt. 2, 1870, p. 81; 23d Rep. New York State Cab. Nat. Hist., 1873, pl. 14, figs. 3-6.—Barrande, Syst. Sil. Centre Boheme, 1881, p. 14, 112.—Zittel, Handb. Pal., 2, 1881, p. 108.—Hall, Pal. New York, 5, pt. 1, Lam., 2, 1885, p. xlvii.—Herrick, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1889, p. 35.—Miller, N. A. Geol. Pal., 1889, p. 475.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 204.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 5.—Koken, Die Leitfossilien, Leipzig, 1896, p. 524.—Hind, Mon. Brit. Carb. Lamellibranchiata, 1, Pal. Soc., 1897, p. 129.—Grabau, Bull. Buffalo Soc. Nat. Hist., 6, 1889, p. 268.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 535.

**Cypricardinia arata** Hall.

*Cypricardinia arata* Hall, 20th Rep. New York State Cab. Hist., 1868, p. 337, pl. 14 (5), fig. 6; rev. ed., 1870, p. 385, pl. 14, fig. 6; 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 174; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 317, pl. 27, fig. 23.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 535.

Niagaran: Racine, Wisconsin, and Bridgeport, Illinois (Racine); Waldron, Indiana; Tennessee (Waldron).

**Cypricardinia canadensis** Grabau.

*Cypricardinia canadensis* Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 170, pl. 23, figs. 14, 15.

Upper Monroan (Amherstburg): Bed of Detroit River, opposite Amherstburg, Ontario.

**CYPRICARDINIA INFLATA** Lesley. See *Cypricardites inflatus*.

**Cypricardinia lamellosa** Hall.

Cypricardinia lamellosa Hall, Pal. New York, 3, 1859, p. 266, pl. 49a, figs. 1a-c.

Cypricardinia cf. lamellosa Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 463, pl. 78, figs. 6, 7.

Helderbergian: Albany County, New York (New Scotland); Keyser, West Virginia (Keyser).

**Cypricardinia subovata** Miller and Dyer.

Cypricardinia subovata Miller and Dyer, Cont. to Pal., 2, 1878, p. 10, pl. 3, figs. 8, 8a. Niagaran (Waldron): Waldron, Indiana.

**Cypricardinia subquadrata** Savage.

Cypricardinia subquadrata Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 95, pl. 5, fig. 26.

Upper Medinan (Edgewood-Noix): Near Louisiana, Missouri.

**Cypricardinia undulostriata** (Hall).

Modiolopsis? undulostriata Hall, Pal. New York, 2, 1852, p. 284, pl. 59, figs. 6a, b.

Cyrtodonta undulostriata Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 410.

Cypricardinia undulostriata Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 561, pl. 37, figs. 9a, b.

Clinton (Rochester): Lockport, New York.

Upper Medinan (Brassfield): Dayton, Ohio.

**Cypricardites** Conrad.

Genotype: *C. curtus* Conrad.

Cypricardites Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 51.

Not Cypricardites of most authors.

Observation.—See Geology of Minnesota, 2, 1897, p. 535, for remarks on this genus.

CYPRICARDITES of authors. See Cyrtodonta Billings, Ortonella Ulrich, and Vanuxemia Billings.

CYPRICARDITES ACUTUMBONA Miller. See Vanuxemia acutumbona.

CYPRICARDITES AFFINIS Miller. See Cyrtodonta affinis.

CYPRICARDITES AMPLUS Miller. See Cyrtodonta ampla.

CYPRICARDITES AMYGDALINA Miller. See Ambonychia amygdalina.

CYPRICARDITES ANGUSTA Miller. See Otenodonta machæriiformis.

CYPRICARDITES ANGUSTIFRONS Conrad. See Modiolopsis modiolaris.

CYPRICARDITES ANODONTOIDES Emmons. See Modiolopsis sinuata.

CYPRICARDITES ANTICOSTIENSIS Miller. See Cyrtodonta? anticostiensis.

CYPRICARDITES BILLINGSI Miller. See Cyrtodonta billingsi.

CYPRICARDITES BREVIUSCULA Miller. See Cyrtodonta breviuscula.

CYPRICARDITES CANADENSIS Miller. See Cyrtodonta canadensis.

CYPRICARDITES? CARINATA Meek. See Whitella carinata.

CYPRICARDITES CASWELLI Foerste. See Cuneamya caswelli.

CYPRICARDITES CINGULATA Ulrich. See Cyrtodonta cingulata.

CYPRICARDITES CORDIFORMIS Miller. See Plethocardia? cordiformis.

*Cypricardites curtus* Conrad.

Not recognized.

*Cypricardites curta* Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 53.

Salmon River: Near Rome, New York, and Richmond, Indiana.

Observation.—Foerste (Bull. Sci. Lab. Denison Univ., 17, 1914, p. 298) attempts to resurrect this form as a species of *Ischyrodonta* with the well-known *I. unionoides* as a synonym. Conrad's definition is worthless, and the figures given by Hall (12th Rep. New York State Cab. Nat. Hist., 1859, p. 9) is a view of the interior of some unknown *Cyrtodonta*.

*CYPRICARDITES DESCRIPTUS* Sardeson. See *Cyrtodonta descriptus*.

*CYPRICARDITES DIGNUS* Sardeson. See *Cyrtodonta dignus*.

*CYPRICARDITES EMMA* Miller. See *Rhytimya emma*.

*CYPRICARDITES FERRUGINEUM* Hall and Whitfield. See *Cyrtodonta? ferruginea*.

*CYPRICARDITES FINITIMUS* Sardeson. See *Cyrtodonta finitimus*.

*CYPRICARDITES (VANUXEMIA) FRAGOSA*. See *Vanuxemia fragosa*.

*CYPRICARDITES GANTI* Miller. See *Modiolodon ganti*.

*CYPRICARDITES GERMANUS* Ulrich. See *Cyrtodonta grandis germana*.

*CYPRICARDITES GLABELLA* Ulrich. See *Cyrtodonta glabella*.

*CYPRICARDITES GRANDIS* Ulrich. See *Cyrtodonta grandis*.

*CYPRICARDITES HAINESI* Miller and Faber. See *Ortonella hainesi*.

*CYPRICARDITES HALLI* Nettelroth. See *Cyrtodonta halli*.

*CYPRICARDITES HARRIETTA* Miller. See *Cyrtodonta? harrietta*.

*CYPRICARDITES HAYNIANUS* Ulrich. See *Vanuxemia hayniana*.

*CYPRICARDITES HINDI* Miller. See *Whitella hindi*.

*CYPRICARDITES HURONENSIS* Miller. See *Cyrtodonta huronensis*.

*Cypricardites inflatus* (Emmons).

Not recognized.

*Nuculites inflata* Emmons, Nat. Hist. Geol. New York, 2, 1842, p. 395, fig. 2.

*Cypricardites inflatus* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

*Cypricardina inflata* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 177, figs.

Trenton: Watertown, New York.

*CYPRICARDITES INSULARIS* Miller. See *Cyrtodonta? insularis*.

*Cypricardites iowensis* (Owen).

*Cardium Iowensis* Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 84, pl. 17, fig. 8.

*Cypricardites iowensis* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Mohawkian: Iowa and Wisconsin.

Observation.—Side view of cast of some unrecognizable pelecypod.

*CYPRICARDITES ISLANDICUS* Hall. See *Cyrtodonta huronensis*.

*CYPRICARDITES LATUS* Miller. See *Modiolopsis latus*.

*CYPRICARDITES LEUCOTHEA* Miller. See *Cyrtodonta leucothea*.



CYPRICARDITES LUCULENTUS Sardeson. See *Cyrtodonta grandis luculenta*.

CYPRICARDITES MEGAMBONUS Whitfield. See *Whitella megambona*.

CYPRICARDITES MINNESOTENSIS Sardeson. See *Cyrtodonta glabella*.

CYPRICARDITES MISENERI Miller. See *Ischyrodonta miseneri*.

CYPRICARDITES? MODESTUS Ulrich. See *Saffordia modesta*.

CYPRICARDITES MODIOLARIS Emmons. See *Modiolopsis modiolaris*.

CYPRICARDITES NANUS Ulrich. See *Vanuxemia nana*.

CYPRICARDITES NASUTA Conrad. See *Orthodesma nasutum*.

CYPRICARDITES NIOTA Hall and Whitfield. See *Vanuxemia niota*.

CYPRICARDITES OBLIQUUS Meek and Worthen. See *Cyrtodonta obliqua*.

CYPRICARDITES OBSOLETUS Lesley. See *Modiolopsis subalatus*.

CYPRICARDITES OBTUSIFRONS Ulrich. See *Vanuxemia obtusifrons*.

CYPRICARDITES OBTUSUS Miller. See *Cyrtodonta obtusa*.

CYPRICARDITES OVALIS Miller. See *Ischyrodonta ovalis*.

CYPRICARDITES OVATA Conrad. See *Modiolopsis modiolaris*.

CYPRICARDITES OVIFORMIS Ulrich. See *Cyrtodonta oviformis*.

CYPRICARDITES PERSIMILIS Miller. See *Cyrtodonta persimilis*.

CYPRICARDITES PLEBEIA Miller. See *Whitella plebeia*.

CYPRICARDITES PONDEROSA Miller. See *Cyrtodonta ponderosa*.

CYPRICARDITES QUADRANGULARIS Whitfield. See *Whitella quadrangularis*.

**Cypricardites?? quadrilatera Hall.**

*Cypricardites? quadrilatera* Hall, 20th Rep. New York State Cab. Hist., 1868, p.

340, pl. 14 (5), figs. 8-10; rev. ed. 1868 (1870), p. 388, pl. 14, figs. 8-10.

Niagaran (Racine): Bridgeport, Illinois.

CYPRICARDITES RECTIROSTRIS Whitfield. See *Vanuxemia rectirostris*.

CYPRICARDITES ROTUNDATA Hall and Whitfield. See *Vanuxemia rotundata*.

CYPRICARDITES ROTUNDATUS (part) Whitfield. See *Vanuxemia suberecta*.

CYPRICARDITES RUGOSUS Miller. See *Cyrtodonta rugosa*.

CYPRICARDITES SAFFORDI Hall. See *Cyrtodonta saffordi*.

CYPRICARDITES SARDESONI Ulrich. See *Vanuxemia sardesoni*.

CYPRICARDITES SIGMOIDEA Miller. See *Whitella? sigmoidea*.

CYPRICARDITES SINUATA Emmons. See *Modiolopsis sinuata*.

CYPRICARDITES SPINIFERA Miller. See *Cyrtodonta spinifers*.

CYPRICARDITES STERLINGENSIS Miller. See *Whitella sterlingensis*.

CYPRICARDITES SUBANGULATUS Miller. See *Cyrtodonta subangulata*.

*CYPRICARDITES SUBCARINATA* Miller. See *Cyrtodonta subcarinata*.

*CYPRICARDITES SUBOVATUS* Miller. See *Cyrtodonta huronensis*.

*CYPRICARDITES SUBSPATULATA* Miller. See *Prolobella subspatulata*.

*CYPRICARDITES SULCODORSATUS* Miller. See *Saffordia sulcodorsata*.

*CYPRICARDITES TENELLUS* Ulrich. See *Cyrtodonta tenella*.

*CYPRICARDITES TERMINALIS* Ulrich. See *Vanuxemia terminalis*.

*CYPRICARDITES TRIANGULARIS* Sardeson. See *Vanuxemia hayniana*.

*CYPRICARDITES UNGULATA* Miller. See *Vanuxemia ungulata*.

*CYPRICARDITES VENTRALIS* Miller. See *Saffordia ventralis*.

*CYPRICARDITES VENTRICOSA* Miller. See *Whitella ventricosa*.

*CYPRICARDITES VENTRICOSUS* Whitfield. See *Cyrtodonta billingsi*.

*CYPRICARDITES VETUSTA* Miller. See *Cuneamya vetusta*.

*CYPRICARDITES VICINUS* Sardeson. See *Vanuxemia obtusifrons*.

*CYPRICARDITES WINCHELLI* Miller. See *Modiolodon winchelli*.

*CYPRICARDITES WORTHENI* Ulrich. See *Vanuxemia wortheni*.

#### **CYPRIDINA** Milne-Edwards.

*Cypridina* Milne-Edwards in Lamarck's *Anim. sans Vert.*, 5, 1838, p. 178.—Miller, *N. A. Geol. Pal.*, 1st App., 1892, p. 706.—Bassler, *Zittel-Eastman Textb. Pal.*, 1913, p. 741.

#### **Cypridina antiqua** Jones.

*Cypridina antiqua* Jones, *Geol. Mag.*, dec. 5, 1, 1904, p. 438, fig. 1.  
Trenton?: Wenoma, Lake Ontario, near Hamilton, Ontario.

#### **CYRTACTINOCERAS** Hyatt.

Genotype: *Cyrtoceras rebelle* Barrande.

*Cyrtactinoceras* Hyatt, *Zittel-Eastman Textb. Pal.*, 1900, p. 528; *ibid.*, 2d ed., 1913, p. 609.—Ruedemann, *Bull. New York State Mus.*, 90, 1906, p. 448.

#### **Cyrtactinoceras boycei** (Whitfield).

*Cyrtoceras boycei* Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 1, 1886, p. 326, pl. 29, fig. 4.—Brainerd and Seely, *Bull. Amer. Mus. Nat. Hist.*, 3, 1890, p. 22.  
*Cyrtactinoceras boycei* Ruedemann, *Bull. New York State Mus.*, 90, 1906, p. 489, pl. 35, figs. 1-4; figs. 45-47.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 117, fig. 1352.

Chazy (Crown Point, Valcour): Isle La Motte, Vermont.

#### **Cyrtactinoceras champlainense** Ruedemann.

*Cyrtactinoceras champlainense* Ruedemann, *Bull. New York State Mus.*, 90, 1906, p. 491, pl. 34, fig. 3; pl. 36, figs. 1, 2, figs. 48-50.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 117.

Chazy (Valcour): Near Chazy, and Saranac River at Plattsburg, New York.

#### **CYRTENDOCERAS** Remele.

*Cyrtendoceras* (Remele) Hyatt, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 515; 2d ed., 1913, p. 596.

**Cyrtendoceras(?) priscum** Ruedemann.

*Cyrtendoceras(?) priscum* Ruedemann, Bull. New York State Mus., 90, 1906, p. 430, pl. 2, figs. 2-5.

Canadian (Beekmantown): Beekmantown, New York.

**CYRTHIA** D'Orbigny. See *Cyrtia* Dalman.

**CYRTIA** Dalman.

Genotype: *Anomites exporrectus* Wahlenberg.

*Cyrtia* Dalman, Kongl. Svenska Vet.-Akad. Handl. for 1827, 1828, pp. 93, 97.—Davidson, British Foss. Brach. Pal. Soc., 1853, p. 83; 1859, p. 66.—Billings, Canadian Jour., 6, 1861, p. 262.—Zittel, Handb. Pal., 1, 1880, p. 683.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 93.—Miller, N. A. Geol. Pal., 1889, p. 342.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 40; 13th Ann. Rep. New York State Geol., 1895, p. 759.—Koken, Die Leitfossilien, Leipzig, 1896, p. 243, fig. 204, 3.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 336; 2d ed., 1913, p. 412.

*Cyrthia* D'Orbigny, Prodr. Pal., 1, 1849, p. 41.

**Cyrtia cliftonensis** Foerste.

*Cyrtia cliftonensis* Foerste, Jour. Geol., 11, 1903, p. 709; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 91, pl. 2, fig. 32.

Niagaran (Brownsport): Near Clifton, Tennessee.

**CYRTIA EXPORRECTA** Hall and Whitfield, 1875. See *Cyrtia exporrecta myrtia*.

**Cyrtia exporrecta** (Wahlenberg).

*Anomites exporrectus* Wahlenberg, Nova Acta Regias Soc. Scient. Upsal, 8, 1821, p. 64.

*Spirifera* (*Cyrtia*) *trapezoidalis* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 183.

*Cyrtia trapezoidalis* Hall and Whitfield, 27th Rep. *ibid.*, 1875, pl. 9, figs. 19-21.

*Cyrtia exporrecta* Dalman, Kongl. Vet.-Akad. Handl. for 1827, 1828, p. 118.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 93, pl. 27, figs. 6-8, 20.—Miller, N. A. Geol. Pal., p. 342, 1889, fig. 557.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 42, pl. 28, figs. 1, 48, 49, 51.

Silurian: Europe; Louisville, Kentucky (Louisville); Osgood, Indiana (Osgood).

*Plesiotype*.—Cat. No. 51326, U.S.N.M.

**CYRTIA EXPORRECTA** VAR. **ARRECTA** Nettelroth. See *Cyrtia exporrecta myrtia*.

**Cyrtia exporrecta myrtia** (Billings).

*Cyrtia myrtia* Billings, Pal. Fossils, 1, 1862, p. 165, fig. 149.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 42.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 443, pl. 9, figs. 10, 12.

*Cyrtia trapezoidalis* var. *arrecta* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 183.

*Cyrtia exporrecta* Hall and Whitfield, 27th Rep. *ibid.*, 1875, pl. 9, figs. 22, 23.

*Cyrtia exporrecta* var. *arrecta* Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 94, pl. 27, fig. 21; pl. 34, fig. 35; pl. 37, figs. 60, 61.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 28, figs. 2, 3; pl. 39, fig. 32.

Anticostian (Chicotte): Southwest Point, Anticosti.

Niagaran: Louisville, Kentucky (Louisville); Indiana and Tennessee (Osgood and Waldron); Wisconsin (Racine).

*Plesiotype*.—Cat. No. 51327, U.S.N.M. (Nettelroth types of *C. exporrecta-arrecta*).



**Cyrtia meta** (Hall).

*Spirifer radiatus* (part) Hall, Pal. New York, 2, 1852, p. 66, pl. 22, figs. 2a-2c, 2t.  
*Spirifera meta* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 372, pl. 13, figs. 12, 13.

*Cyrtia radians* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, pp. 42, 362, pl. 28, figs. 4, 5, 50, 52; pl. 39, fig. 33.

Niagaran: Rochester, New York (Clinton); Milwaukee, Wisconsin (Racine).

**CYRTIA MYRTIA** Billings. See *Cyrtia exporrecta myrtia*.

**CYRTIA RADIAN**s Hall and Clarke. See *Cyrtia meta*.

**CYRTIA TRAPEZOIDALIS** var. **ARRECTA** Hall and Whitfield. See *Cyrtia exporrecta myrtia*.

**CYRTIDOCRINUS** Angelin. See *Lecanocrinus* Hall.

**CYRTINA** Davidson.

Genotype: *Cyrtia heteroclita* DeFrance.

*Cyrtina* Davidson, Mon. British Carb. Brach. Pal. Soc., 1859, p. 66.—Hall, Pal. New York, 4, 1867, p. 263; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 251.—Zittel, Handb. d. Pal., 1, 1880, p. 683.—Davidson, Mon. British Foss. Brach., 5, Sil. Suppl., Pal. Soc., 1882, p. 80.—Herrick, Bull. Sci. Lab. Denison Univ., 4, 1888, p. 14.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 95.—Miller, N. A. Geol. Pal., 1889, p. 342.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 43; 13th Ann. Rep. New York State Geol., 1895, p. 763.—Koken, Die Leitfossilien, Leipzig, 1896, p. 243, figs. 204, 6.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 219.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 335, 2d ed., 1913, p. 412.—Grabau, Bull. New York State Mus., 45, 1901, p. 197; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 197.

**Cyrtina magnaplicata** Weller.

*Cyrtina magnaplicata* Weller, Geol. Surv. New Jersey Pal., 3, 1903, p. 238, pl. 21, figs. 46-49.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

**Cyrtina pyramidalis** (Hall).

*Spirifer pyramidalis* Hall, Pal. New York, 2, 1852, p. 266, pl. 54, fig. 7.

*Cyrtina pyramidalis* Miller, N. A. Geol. Pal., 1889, p. 343.—Grabau, Bull. New York State Mus., 45, 1901, p. 197, fig. 115; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 197, fig. 115.

Clinton (Rochester): Lewiston, New York.

**CYRTOCERAS** Goldfuss.

Genotype: *C. depressum* Goldfuss.

*Cyrtoceras* Goldfuss, in De la Beche's Handbuch der Geognosie, 1832, p. 536.—Portlock, Rep. Geol. Londonderry, 1843, p. 411.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 11.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 1.—Woodward, Man. Mollusca, pt. 1, 1851, p. 91.—Saemann, Palaeontographica, 3, 1852, pp. 156, 161.—McCoy, Brit. Pal. Rocks Foss., 1854, p. 312.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 652.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 158.—Emmons, Amer. Geology, 1, pt. 3, 1855, p. 147.—Billings, Canadian Nat. Geol., 2, 1857, p. 136, pl. 2, fig. 3.—Chapman, Canadian Jour., n. s., 2, 1857, p. 266; 8, 1863, p. 22.—Salter, Geol. Surv. Canada, dec. 1, 1859, p. 31.—Barrande, Syst. Sil. Centre Boheme, 2, pt. 1, 1867, p. 375.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 131.—Hall, Pal. New York, 5, pt. 2, 1879, pp. 354, 368, 389.—Blake, Mon. Brit. Foss. Cephalopoda, 1882, p. 54.—Zittel, Handb. d. Pal., 2, 1884, p. 373.—Foord, Cat. Foss. Ceph. Brit. Mus.,

**CYRTOCERAS**—Continued.

vol. 1, 1888, p. 262.—Miller, N. A. Geol. Pal., 1889, p. 432.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 102.—Koken, Die Leitfossilien, Leipzig, 1896, p. 49, fig. 33.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 803.—Grabau, Bull. New York State Mus., 45, 1901, p. 216; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 216.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 530.—Foord, Mon. Carb. Ceph. Ireland, pt. 5, Pal. Soc., App., 1903, p. 212.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 94.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1026.—Hyatt, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 611.

*Glyptodendron* Claypole, Amer. Jour. Sci. Arts, 15, 1878, p. 302. (Genotype: *G. eatonense* Claypole).—Foerste, Amer. Geol., 12, 1893, pp. 134–139.

*Glyptoceras* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 537. (Genotype: *G. eatonense* Claypole.).

**CYRTOCERAS?** **ABRUPTUM** Hall. See *Orthoceras abruptum*.

**Cyrtoceras?** **acinacellum** Whitfield.

*Cyrtoceras acinacellum* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 327, pl. 27, figs. 10–13.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 508.

Canadian (Beekmantown): Fort Cassin, Vermont.

**Cyrtoceras** **alethes** Billings.

*Cyrtoceras Alethes* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 193, text fig. 177a-c.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

**Cyrtoceras** **amœnum** Miller.

*Cyrtoceras amœnum* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 105, pl. 3, fig. 8.—James, J. F., *ibid.*, 8, 1886, p. 247.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1027, pl. 49, fig. 1.

Richmond (Whitewater): Richmond, Indiana.

**CYRTOCERAS** (**PHRAGMOCERAS**) **AMPLICORNE** Hall. See *Halloceras hercules*.

**CYRTOCERAS** **ANNULATUM** Hall. See *Spyroceras subannulatum*.

**CYRTOCERAS** **ARCTICAMERATUM** Hall. See *Mælonoceras arcticameratum*.

**CYRTOCERAS** **ARCUATUM** Hall. See *Cyrtoceras subarcuatum*.

**Cyrtoceras** **aristides** Billings.

*Cyrtoceras aristides* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 316.

Canadian (Beekmantown): Phillipsburg, Quebec.

**Cyrtoceras** **baffinense** Schuchert.

*Cyrtoceras baffinensis* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 171, pl. 14, figs. 11–13.

Mohawkian: Head of Frobisher Bay, Baffin Land.

*Holotype*.—Cat. No. 28198, U.S.N.M.

**Cyrtoceras** **beekmanense** Whitfield.

*Cyrtoceras beekmanensis* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 57, pl. 10, figs. 2, 3.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 506.

Canadian (Beekmantown): Beekmantown, New York.

**CYRTOCERAS** **BILINGSI** Salter. See *Zitteloceras billingsii* and *Z. hallianum*.

*CYRTOCERAS BONDI* Safford. See *Plectoceras bondi*.

*Cyrtoceras bovinum* Clarke and Ruedemann.

*Cyrtoceras bovinum* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 90, pl. 16, figs. 8, 9; pl. 18, figs. 5, 6.

Niagaran (Guelph): Rochester, New York.

*CYRTOCERAS BOYCH* Whitfield. See *Cyrtactinoceras boycei*.

*CYRTOCERAS BREVICORNE* Hall. See *Cyclostomiceras brevicorne*.

*Cyrtoceras camurum* Hall.

*Cyrtoceras camurum* Hall, Pal. New York, 1, 1847, p. 196, pl. 42, fig. 6.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Whitfield, Geol. Wisconsin, 4, 1882, p. 231, pl. 7, figs. 7, 8, 9.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 805, pl. 60, figs. 5, 6.

Mohawkian: Middleville, New York (Trenton): Beloit, Wisconsin (Black River).

*CYRTOCERAS? CANCELLATUM* Hall. See *Cyrtoceras subcancellatum*.

*Cyrtoceras capricornulus* (Troost).

Not recognized.

*Conilites capricornulus* Troost, 5th Geol. Rep. Tennessee, 1840, p. 50.

*Cyrtoceras capricornulus* Troost, 6th Geol. Rep. Tennessee, 1841, p. 178.

Ordovician(?): Davidson County, Tennessee.

*Cyrtoceras carrollense* Worthen.

*Cyrtoceras Carrollensis* Worthen, Geol. Surv. Illinois, 6, 1875, p. 496, pl. 23, fig. 3.

Trenton (Galena): Carroll County, Illinois.

*Cyrtoceras cinctutum* Foerste.

*Cyrtoceras cinctutus* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 61, pl. 3, figs. 37a-b.

Niagaran (Osgood): Clifton, Tennessee.

*Cyrtoceras clintonense* Foerste.

*Cyrtoceras Clintonense* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 534, pl. 36, figs. 2a-e.

Upper Medinan (Brassfield): Huffmans quarry, near Dayton, Ohio.

*Cyrtoceras clitus* Billings.

*Cyrtoceras clitus* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 85, fig. 24.

Niagaran (Lockport): Grimsby, Ontario.

*Cyrtoceras confertissimum* Whitfield.

*Cyrtoceras confertissimum* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 327, pl. 27, figs. 7-9.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 506, pl. 38, figs. 1-4.

Canadian (Beekmantown): Fort Cassin, Vermont; Valcour, New York.

*Cyrtoceras conicum* Owen.

Not recognized.

*Cyrtoceras conicum* Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 70, pl. 16, fig. 9.

Mohawkian: Wisconsin.

*Cyrtoceras conoidale* Wetherby.

*Cyrtoceras conoidale* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 78, pl. 2, figs. 6, 6a.

Maysville: Maury County, Tennessee (Leipers); Boyle and Garrard Counties, Kentucky.



**Cyrtoceras constrictostriatum** Hall.

*Cyrtoceras constrictostriatum* Hall, Pal. New York, 1, 1847, p. 195, pl. 42, figs. 2a, b, 3c, d.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147.

Trenton: Middleville, New York.

**CYRTOCERAS CONSTRICTUM** Billings. See *Oncoceras constrictum*.

**Cyrtoceras cordatum** Parks.

*Cyrtoceras cordatum* Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 42.

Niagaran: Mouth of Nelson River, Manitoba.

**CYRTOCERAS CORNICULUM** Hall. See *Cyrtoceras tenuistriatum*.

**Cyrtoceras cornulum** Schuchert.

*Cyrtoceras cornulum* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 170, pl. 14, figs. 8–10.

Mohawkian: Head of Frobisher Bay, Baffin Land.

*Cotype*.—Cat. No. 28121, U.S.N.M.

**Cyrtoceras corydon** Billings.

*Cyrtoceras Corydon* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 85, fig. 23.

Niagaran (Lockport): Grimsby, Ontario.

**Cyrtoceras(?) cuneatum** Whiteaves.

*Cyrtoceras(?) cuneatum* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 282; Ottawa Nat., 20, p. 133, figs.

Niagaran: Stonewall, Manitoba.

**Cyrtoceras? dactyloides** Dwight.

*Cyrtoceras? dactyloides* Dwight, Amer. Jour. Sci. Arts, 3d ser., 27, 1884, p. 255, pl. 7, figs. 9, 9a.

Canadian (Beekmantown): Rochdale, New York.

**CYRTOCERAS DARDANUM** Hall. See *Cyrtorizoceras dardanum*.

**Cyrtoceras dictys** Billings.

*Cyrtoceras Dictys* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 192, fig. 176.

Canadian (Levis): Point Levis, Quebec.

**Cyrtoceras dresbachense** Sardeson.

*Cyrtoceras dresbachense* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 102, pl. 6, fig. 4.

Ozarkian (Oneota): Dresbach, Minnesota.

**Cyrtoceras dunleithense** Miller and Gurley.

*Cyrtoceras dunleithense* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 11, 1896, p. 30, pl. 3, figs. 11, 12.

Black River (Platteville): Dunleith, Illinois.

**Cyrtoceras (Glyptoceras) eatonense** (Claypole).

*Glyptodendron eatonense* Claypole, Amer. Jour. Sci. Arts (3), 15, 1878, p. 302; Geol. Mag., dec. 2, 5, 1878.—Miller, N. A. Geol. Pal., 1889, p. 119, fig. 39.

*Cyrtoceras (Glyptoceras) eatonense* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 535, pl. on p. 536, figs. 1a–c, 2.

*Cyrtoceras (Glyptodendron) eatonense* Foerste, Amer. Geol., 12, 1893, p. 139, pl. 7, figs. 1, 2.

Upper Medinan (Brassfield): Near Eaton and near Dayton, Ohio.

**Cyrtoceras eugium** Hall.

*Cyrtoceras eugium* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 40.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 66, pl. 9, figs. 3, 4.  
Black River (Platteville): Beloit, Wisconsin.

CYRTOCERAS EXIGUUM Billings. See *Oncoceras exiguum*.

**Cyrtoceras faberi** J. F. James.

*Cyrtoceras faberi* James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246, pl. 4, figs. 3a, b.  
Richmond: Waynesville, Ohio.

CYRTOCERAS FALX Billings. See *Mælonoceras falx*.

**Cyrtoceras featherstonhaughii** Clarke.

*Cyrtoceras featherstonhaughii* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 807, pl. 58, figs. 12-15.  
Black River (Platteville): Cannon Falls, Minnesota.

**Cyrtoceras filosum** (Conrad).

*Cyrtoceras filosum* (Conrad M. S.) Emmons, Nat. Hist. New York Geol., 2, 1842, p. 392, fig. 4.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 369, fig. 4 on p. 365.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 181, fig.

*Cyrtolites filosum* Hall, Pal. New York, 1, 1847, p. 190, pl. 41, figs. 3a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 167, pl. 12, fig. 4; Man. Geol., 1860, p. 98, fig. 87.

Trenton: Watertown, New York.

CYRTOCERAS FOSTERI Hall. See *Cyrtorizoceras fosteri*.

CYRTOCERAS FRAGILE Billings. See *Oncoceras fragile*.

CYRTOCERAS FULTONENSIS Meek and Worthen. See *Cyrtorizoceras dardanum*.

CYRTOCERAS GIGANTEUM McChesney. See *Nautilus?? cancellatus*.

**Cyrtoceras gracile** Cleland.

*Cyrtoceras* sp. Cleland, Amer. Pal., 3, Bull. 13, 1900, p. 19, pl. 17, figs. 5, 6.

*Cyrtoceras gracilis* Cleland, Bull. Amer. Pal., 4, 1903, p. 13, pl. 3, fig. 11.

Canadian (Tribes Hill): Fort Hunter, Tribes Hill, and Canajoharie, New York.

CYRTOCERAS HALLEANUS D'Orbigny. See *Zitelloceras hallianum*.

CYRTOCERAS HERCULES Hall. See *Protophragmoceras hercules*.

CYRTOCERAS HERTZERI Hall and Whitfield. See *Hexameroceras hertzeri*.

**Cyrtoceras hitzi** Foerste.

*Cyrtoceras hitzi* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 78, pl. 1, fig. 7a, b; pl. 2, figs. 23a-c.

Richmond (Whitewater-Saluda): Madison, Indiana.

**Cyrtoceras houghtoni** Clarke.

*Cyrtoceras houghtoni* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 807, pl. 59, figs. 12-15.

Black River (Platteville): Cannon Falls, Minnesota.

**Cyrtoceras howardi** Miller.

*Cyrtoceras howardi* Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 323, pl. 12, fig. 1; adv. sheets, 1892, p. 69, pl. 12, fig. 1.

Niagaran (Laurel): St. Paul, Indiana.

*CYRTOCERAS HURONENSE* Billings. See *Oncoceras huronense*.

***Cyrtoceras indianense* Miller.**

*Cyrtoceras indianensis* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 698, pl. 18, fig. 1, 2; adv. sheets, 1891, p. 88.

Niagaran (Laurel): St. Paul and Hartsville, Indiana.

***Cyrtoceras infundibulum* Whitfield.**

*Cyrtoceras infundibulum* Whitfield, Ann. Rep. for 1879, Geol. Surv. Wisconsin, 1880, p. 66; Geol. Wisconsin, 4, 1882, p. 300, pl. 20, figs. 4, 5.

Niagaran (Racine): Racine, Wisconsin.

***Cyrtoceras irregulare* Wetherby.**

*Cyrtoceras irregulare* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 79, pl. 2, fig. 3.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246.

Richmond (Waynesville): Oregonia (Freeport) and Waynesville, Ohio; Versailles, Indiana.

*CYRTOCERAS ISODORUS* Billings. See *Cyrtorizoceras isodorus*.

***Cyrtoceras juvenalis* Billings.**

*Cyrtoceras juvenalis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 177; App., p. 420, fig. 400a, b.

Trenton: Montreal, Quebec.

*CYRTOCERAS KIRBYI* Whitfield. See *Ooceras kirbyi*.

*CYRTOCERAS LAMELLOSUM* Hall. See *Zitteloceras hallianum*.

***Cyrtoceras laterale* Hall.**

*Cyrtoceras laterale* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 357, pl. 18 (9), figs. 4–6; rev. ed., 1870, p. 407, pl. 18, figs. 4–6, pl. 24, fig. 5.

Niagaran (Racine and Guelph): Racine, Wisconsin.

***Cyrtoceras laticurvatum* Whiteaves.**

*Cyrtoceras laticurvatum* Whiteaves, Canadian Rec. Sci., 6, 1895, p. 395.; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 224, fig. 14.

Black River or Richmond: Lake Winnipeg, Canada.

***Cyrtoceras ligarius* Billings.**

*Cyrtoceras Ligarius* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 176.

Richmond: Drummond Island, Lake Huron.

***Cyrtoceras loculosum* Hall.**

*Cyrtoceras loculosum* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 42.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 67, pl. 9, figs. 6–9.

Ozarkian (Oneota): Madison, Wisconsin.

***Cyrtoceras lucillum* Hall.**

*Cyrtoceras lucillum* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 349, pl. 18 (9), fig. 7; rev. ed., 1870, p. 406, pl. 18, fig. 7.

Niagaran (Racine): Wauwatosa, Wisconsin.

***Cyrtoceras luthel* Calvin.**

*Cyrtoceras luthel* Calvin, Amer. Geol., 10, 1892, p. 147; Bull. Lab. Nat. Hist. State Univ. Iowa, 2, 1892, p. 193.

Ozarkian (Oneota): Northeastern Iowa.

***Cyrtoceras lysander* Billings.**

*Cyrtoceras Lysander* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 161, fig. 146a–d (adv. sheets, 1862).

Richmond: Cape Smyth, Manitoulin Island, Lake Huron.



**Cyrtoceras macrostomum** Hall.

*Cyrtoceras marginalis* Conrad (not Phillips, 1841), Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 334.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147, fig. 30.

*Cyrtoceras macrostomum* Hall, Pal. New York, 1, 1847, p. 194, pl. 42, figs. 1a-c, 3a-b.—Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 584.

Black River: Mineral Point, Wisconsin (Platteville); Middleville, New York; Carlisle, Pennsylvania.

**Cyrtoceras magister** Miller.

*Cyrtoceras obscura* Miller (not Barrande), Cincinnati Quart. Jour. Sci., 2, 1875, p. 132, text fig. 17.

*Cyrtoceras magister* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 284.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246.—Miller, N. A. Geol. Pal., 1889, p. 434, fig. 729.

Eden (Southgate): Cincinnati, Ohio.

**Cyrtoceras manitobense** Whiteaves.

*Cyrtoceras Manitobense* Whiteaves, Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 80, pl. 13, figs. 3-5; pl. 15, fig. 4; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 223.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 170.

*Oncoceras manitobense* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 799.

Black River or Richmond: Lake Winnipeg, Manitoba; Baffin Land.

**CYRTOCERAS MARGINALIS** Conrad. See *Cyrtoceras macrostomum*.

**Cyrtoceras markoei** Castelnau.

Not recognized.

*Cyrtoceras Markoei* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 30, pl. 9, fig. 3.

Ordovician: Montmorency River, Canada.

**Cyrtoceras massiense** Safford.

*Cyrtoceras Massiense* Safford, Geol. Tennessee, 1869, p. 290, pl. 4 (G 3), fig. 4a, b. Trenton: Nashville, Tennessee.

**Cyrtoceras mecoyi** Billings.

*Cyrtoceras McCoyi* Billings, Canadian Nat. Geol., 4, 1859, p. 467.

Chazyan: Mingan Islands, Quebec.

**CYRTOCERAS METELLUS** Billings. See *Mælonoceras metellus*.

**Cyrtoceras microscopicum** Dwight.

*Cyrtoceras microscopicum* Dwight, Amer. Jour. Sci. Arts (3), 27, 1884, p. 256, pl. 7, fig. 11.

Canadian (Beekmantown): Rochdale, New York.

**CYRTOCERAS MINNEAPOLIS** Clarke. See *Cyrtorizoceras minneapolis*.

**Cyrtoceras missisquoi** Billings.

*Orthoceras Missisquoi* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 314, fig. 303.

*Cyrtoceras missisquoi* Miller, N. A. Geol. Pal., 1889, p. 435 (gen. ref.).

Canadian (Beekmantown): Phillipsburg, Quebec.

**Cyrtoceras multicameratum** Hall.

*Cyrtoceras multicameratum* Hall, Pal. New York, 1, 1847, p. 195, pl. 42, fig. 4.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147.

Trenton: Middleville, New York.

*CYRTOCERAS MYRICE* Hall and Whitfield. See *Kionoceras darwini*.

***Cyrtoceras nashvillense* Miller.**

*Cyrtoceras nashvillensis* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 697, pl. 16, fig. 1; adv. sheets, 1891, p. 87.

Niagaran (Osgood or Laurel): West of Nashville, Tennessee.

*CYRTOCERAS NELEUS* Hall. See *Mælonoceras neleus*.

***Cyrtoceras norwoodi* Clarke.**

*Cyrtoceras norwoodi* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 809, pl. 60, figs. 7-9.

Black River (Platteville): Rockton, Illinois.

*CYRTOCERAS OBSCURA* Miller. See *Cyrtoceras magister*.

*CYRTOCERAS ORCAS* Hall. See *Oncoceras orcas*.

***Cyrtoceras orestes* Billings.**

*Cyrtoceras Orestes* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 177.

Upper Medinan (Cataract): West Flamborough, Ontario.

*CYRTOCERAS ORODES* Billings. See *Cyclostomiceras orodes*.

*CYRTOCERAS PLANODORSATUM* Whitfield. See *Tripteroceras planodorsatum*.

***Cyrtoceras postumilus* Billings.**

*Cyrtoceras Postumius* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 178.

Richmond: Cape Smyth, Manitoulin Island, Lake Huron.

***Cyrtoceras pusillum* Hall.**

*Cyrtoceras pusillum* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 357; rev. ed., 1870, p. 407.

Niagaran (Racine): Racine, Wisconsin.

***Cyrtoceras quebecense* Whiteaves.**

*Cyrtoceras Quebecense* Whiteaves, Ottawa Nat., 12, 1898, p. 120; Geol. Surv.

Canada, Pal. Foss., 3, pt. 4, 1906, p. 315, pl. 35, figs. 1, 1a.

Canadian (Levis limestone): Point Levis, Quebec.

*CYRTOCERAS RAEI* Whitfield. See *Ooceras? raei*.

***Cyrtoceras rectum* Whitfield.**

*Cyrtoceras rectum* Whitfield, Ann. Rep. for 1877, 1878, p. 85; Geol. Wisconsin, 4, 1882, p. 319, pl. 24, figs. 6, 8.

Niagaran (Guelph): Carlton, Wisconsin.

***Cyrtoceras regulare* Billings.**

*Cyrtoceras regulare* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 314.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

***Cyrtoceras reversum* Spencer.**

Not recognized.

*Cyrtoceras reversum* Spencer, Bull. Missouri State Mus., 8, 1884, p. 60, pl. 7, fig. 8; Trans. Acad. Sci. St. Louis, 4, 1884, p. 610, pl. 7, fig. 8.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 96.

Niagaran (Lockport): Limehouse Station, Ontario.

Observation.—Cast of the living chamber probably of *Poterioceras sauridens* Clarke and Ruedemann, figured in a reversed position.

**Cyrtoceras rigidum** Hall.

*Cyrtoceras rigidum* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 358, fig., pl. 16 (7), figs. 3-5; rev. ed., 1870, p. 408, pl. 16, figs. 3-5, text fig. 5.  
Niagaran (Racine): Bridgeport, Illinois.

**Cyrtoceras saffordi** Miller.

*Cyrtoceras saffordi* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 698, pl. 17, figs. 2, 3; adv. sheets, 1891, p. 88.  
Trenton (Catheys): Nashville, Tennessee.

**Cyrtoceras scofieldi** Clarke.

*Cyrtoceras scofieldi* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 810, pl. 49, figs. 9-11.  
Black River (Platteville): Janesville, Wisconsin.

**CYRTOCERAS SEPTORIS** Hall and Whitfield. See *Septameroceras septore*.

**Cyrtoceras shumardi** Clarke.

*Cyrtoceras shumardi* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 810, pl. 60, figs. 1-4.  
Black River (Platteville): Cannon Falls, Minnesota.

**Cyrtoceras simplex** Billings.

*Cyrtoceras simplex* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 313.  
Black River: "Lot N. concession A. Nepean," Canada.

**Cyrtoceras sinuatum** Billings.

*Cyrtoceras sinuatum* Billings, Geol. Surv. Rep. Progr. for 1853-56, 1857, p. 315.—  
Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 312, pl. 40, figs. 3, 3a.  
Black River (Leray): La Petite Chaudière, Ottawa River, Canada.

**Cyrtoceras? stonense** Safford.

*Cyrtoceras? stonense* Safford, Geol. Tennessee, 1869, p. 290, pl. 4 (G. 3), figs. 2a-c.  
Stones River (Murfreesboro): Murfreesboro, Tennessee.

**CYRTOCERAS SUBANNULATUS** D'Orbigny. See *Spyroceras subannulatum*.

**Cyrtoceras subarcuatum** D'Orbigny.

*Cyrtoceras arcuatum* Hall (not Steining, 1830), Pal. New York, 1, 1847, p. 196, pl. 42, figs. 5a-c.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147.  
*Cyrtoceras subarcuatum* D'Orbigny, Prodr. de Pal., 1, 1849, p. 2.  
Trenton: Middleville, New York.

**Cyrtoceras subcancellatum** Hall.

*Cyrtoceras? cancellatum* Hall (preoccupied), Pal. New York, 2, 1852, p. 290, pl. 61, figs. 2a-c.  
*Cyrtoceras subcancellatum* Hall, Miller's N. A. Geol. Pal., 1st ed., 1877, p. 243.—  
Grabau, Bull. New York State Mus., 45, 1901, p. 216, fig. 148; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 216, fig. 148.  
Clinton (Rochester): Niagara Falls, etc., New York.

**Cyrtoceras (Glyptoceras) subcompressum** Beecher.

*Cyrtoceras subcompressum* Beecher, 5th Rep. State Geol. New York for 1885, 1886, pl. 14, figs. 2, 3; Pal. New York, 7, Sup., 1888, p. 35, pl. 129, figs. 2, 3.—  
Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 276, pl. 7, fig. 7.



**Cyrtoceras (Glyptoceras) subcompressum**—Continued.

*Cyrtoceras (Glyptoceras) subcompressum* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 535, pl. 32, figs. 7a-d; fig. 3 of pl. on p. 536.

*Cyrtoceras (Glyptodendron) subcompressum* Foerste, Amer. Geol., 12, 1893, p. 139, pl. 7, fig. 3.

Upper Medinan (Brassfield): Near New Carlisle and near Springfield, Ohio.

**Cyrtoceras subrectum** Hall.

*Cyrtoceras subrectum* Hall, Pal. New York, 3, 1859, 1861, p. 342, pl. 69, figs. 3a-3d.

Cayugan (Manlius): Herkimer County, New York.

**Cyrtoceras subturbinatum** Billings.

*Cyrtoceras subturbinatum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 312.

Chazyan (Mingan): Mingan Island, Quebec.

**Cyrtoceras surgens** Barrande.

*Cyrtoceras surgens* Barrande, Syst. Sil. Centre Boheme, 2, pt. 3, 1870, p. 728, pl. 431, figs. 16, 17.

Canadian (Levis): Point Levis, Quebec.

**CYRTOCERAS SYPHAX** Billings. See *Eremoceras siphax*.**Cyrtoceras tenuiseptum** Faber.

*Cyrtoceras tenuiseptum* Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 18, pl. 1, figs. 3a, b, c.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1028, pl. 49, figs. 2, 2a.

Richmond (Waynesville): Near Waynesville, Ohio; Versailles, Indiana.

**Cyrtoceras tenuistriatum** Hall.

*Cyrtoceras corniculum* Hall (preoccupied), Rep. Geol. Surv. Wisconsin, 1862, p. 41, figs. 1, 2.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 809, pl. 59, fig. 16.

*Cyrtoceras tenuistriatum* Hall, in Miller's Amer. Pal. Foss., 1877, p. 243.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 9, fig. 12.

Black River: Mineral Point, Wisconsin (Platteville): Warsaw, Minnesota (Decorah).

**Cyrtoceras thompsoni** Miller.

*Cyrtoceras thompsoni* Miller, 18th Ann. Rep. Indiana, Dep. Geol., Nat. Res., 1894, p. 323, pl. 10, figs. 7, 8 (adv. sheets 1892).—Cumings, 32d Ann. Rep. Dep.

Geol. Nat. Res. Indiana, 1908, p. 1029, pl. 49, figs. 3, 3a.

Richmond: Longwood, Fayette County, Indiana.

**Cyrtoceras trentonense** (Emmons).

*Orthoceratites trentonensis* Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 396, fig. 2.

*Cyrtoceras trentonensis* D'Orbigny, Prodr. de Pal., 1, 1849, p. 2 (gen. ref.).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 181, fig.

*Oncoceras trentonense* Lesley, Ibid., p. 494, fig.

Trenton: New York.

**Cyrtoceras vallandighami** Miller.

*Cyrtoceras vallandighami* Miller, Cincinnati Quart., Jour. Sci., 1, 1874, p. 232, fig. 23.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 245.—

Miller, N. A. Geol. Pal., 1889, p. 435, fig. 730.

Maysville: Cincinnati, Ohio, and vicinity (Fairmount); Nashville and Columbia, Tennessee (Leipers).

**Cyrtoceras vassarina** Dwight.

*Cyrtoceras Vassarina* Dwight, Amer. Jour. Sci. Arts, 3d ser., 27, 1884, p. 254, pl. 7, figs. 7, 7a, 8.

Canadian (Beekmantown): Rochdale, New York.

**Cyrtoceras ventricosum** Miller.

*Cyrtoceras ventricosa* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 131, fig.

16.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246.—Miller, N. A. Geol. Pal., 1889, p. 435, fig. 731.

Eden (Southgate): Cincinnati, Ohio.

**Cyrtoceras whitneyi** Hall.

*Cyrtoceras whitneyi* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 39.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 65, pl. 9, fig. 5.

Richmond (Maquoketa): Maquoketa Creek, Iowa.

**Cyrtoceras(?) winonicum** Sardeson.

*Cyrtoceras(?) winonicum* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 102, pl. 6, figs. 2, 3.

Ozarkian (Oneota): Near Dresbach, Winona County, Minnesota.

**CYRTOCERINA** Billings.

Genotype: *C. typica* Billings.

*Cyrtocerina* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 178.—Barrande, Syst. Sil. Centre Boheme, 2, pt. 1, 1867, p. 451.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 266.—Miller, N. A. Geol. Pal., 1889, p. 436.—Holm, Geol. Foren. Stockholm Forenhandl., 14, 1892, pp. 126, 209.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 774.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 517; 2d ed., 1913, p. 597.

**Cyrtocerina madisonensis** (Miller).

*Tryblidium madisonense* Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 318, pl. 9, fig. 38 (adv. sheets, 1892).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 977, pl. 39, fig. 10.

*Cyrtocerina madisonensis* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 32.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 74.

Richmond (Whitewater-Saluda): Madison, Indiana.

**Cyrtocerina mercurius** Billings.

*Cyrtocerina Mercurius* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 194, text fig. 179.

Canadian (Levis): Point Levis, Quebec.

**Cyrtocerina(?) schoolcrafti** Clarke.

*Cyrtocerina(?) schoolcrafti* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 774, pl. 47 figs. 12-14.

Black River (Decorah): Near Cannon Falls, Minnesota.

*Holotype*: Cat. No. 46526, U.S.N.M.

**Cyrtocerina typica** Billings.

*Cyrtocerina typica* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 178, text fig. 159.—Miller, N. A. Geol. Pal., 1889, p. 436, fig. 732.

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

**CYRTODONTA** Billings.

Genotype: *C. rugosus* and *C. canadense* Billings.

*Cyrtodonta* Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 179; Canadian Nat. Geol., 3, 1858, p. 431; *ibid.*, 4, 1859, p. 303; *ibid.*, 6, 1861, p. 353; *ibid.*, 7, 1862, p. 392.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 310.—Zittel, Handb. Pal., 2, 1881, p. 50.—Salter, Mem. Geol. Surv. Great

**CYRTODONTA**—Continued.

Britain, 2d ed., 1881, p. 546.—Ulrich, Geol. Minnesota, Pal., 3, pt. 2, 1894, p. 534.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 365.—Koken, Die Leitfossilien, Leipzig, 1896, p. 185, fig. 151, 2.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 980.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 409.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 442.

Palaearca Hall, Pal. New York, 3, 1859, p. 27.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 341.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 310, footnote.—Salter, Cat. Camb. Sil. Foss., 1873, p. 66.

Angellum Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 105 (Genotype: *A. cuneatum* Miller).

Cypriocardites Vanuxem (not Conrad), Nat. Hist. New York, Geol. 3, 1842, p. 65, footnote.—Hall, Pal. New York, 1, 1847, p. 157 footnote; 12th Rep. New York State Cab. Nat. Hist., 1859, pp. 9, 13; Pal. New York, 3, 1859, p. 270, footnote; p. 524; 15th Rep. New York State Cab. Nat. Hist., 1861, pp. 192, 193, pl. 11, fig. 4.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 309.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 134.—Miller, Cincinnati, Quart. Jour. Sci., 1, 1874, p. 147.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 206.—Miller, N. A. Geol. Pal., 1889, p. 476.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, pp. 29–31.

Observation.—See *Bodmania* Miller for a probable synonym.

**CYRTODONTA** (part) Safford. See *Modiolodon* Ulrich.

**CYRTODONTA ACUTUMBONA** Billings. See *Vanuxemia acutumbona*.

**Cyrtodonta affinis** Ulrich.

*Cyrtodonta affinis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 540, pl. 39, figs. 20–23.

*Cypriocardites affinis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Black River (Decorah): Six miles south of Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 46171, U.S.N.M.

**Cyrtodonta affinis fillmorensis** Ulrich.

*Cyrtodonta affinis* var. *fillmorensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 540, pl. 39, fig. 23.

Trenton (Prosser): Near Wykoff, Fillmore County, Minnesota.

*Holotype*.—Cat. No. 46172, U.S.N.M.

**Cyrtodonta? alata** (Hall).

*Posidonia? alata* Hall, Geol. Rep. 4th Dist. New York, 1843, p. 72, fig. 7; Pal. New York, 2, 1852, p. 87, pl. 27, fig. 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 737, fig.

*Posidonomya alata* Miller, N. A. Geol. Pal., 1889, p. 504 (gen. ref.).

Clinton: Rochester, New York.

**Cyrtodonta ampla** Ulrich.

*Cyrtodonta ampla* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 538, pl. 39, fig. 34.

*Cypriocardites amplus* Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Black River (Platteville): Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 46173, U.S.N.M.

**Cyrtodonta? anticostiensis** Billings.

*Cyrtodonta? Anticostiensis* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 14.

*Cypriocardites anticostiensis* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Richmond (English Head and Charleton): English Head, Anticosti.



**Cyrtodonta billingsi** Ulrich.

*Cypricardites ventricosus* Whitfield (not Hall), Geol. Wisconsin, 4, 1882, p. 209, pl. 5, fig. 9.

*Cyrtodonta billingsi* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 538, pl. 40, figs. 2-6.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 166, pl. 11, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 409, figs. 528d, e.

Black River: Dunleith, Illinois; Beloit, Mineral Point, etc., Wisconsin; Cannon Falls, etc., Minnesota (Platteville); Lincoln County, Missouri (Decorah); New Jersey (Jacksonburg).

*Cotypes*.—Cat. Nos. 46174, 46175, U.S.N.M.

**Cyrtodonta breviscula** Billings.

*Cyrtodonta breviscula* Billings, Canadian Nat. Geol., 4, 1859, p. 446.—Whiteaves, Ottawa, Nat., 22, 1908, p. 107, pl. 3, fig. 3.

*Cypricardites breviscula* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Stones River (Pamelia): Near Ottawa, Ontario.

**Cyrtodonta canadensis** Billings.

*Cyrtodonta Canadensis* Billings, Canadian Nat. Geol., 3, 1858, p. 434, figs. 8-11; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 182, figs. 8-10; p. 183, fig. 11; Geol. Canada, Geol. Surv. Canada, 1863, p. 148, fig. 106.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 241.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 167, pl. 11, fig. 3.

*Cypricardites canadensis* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Black River: St. Josephs Island, La Petite Chaudiere Rapids, Pauquettes Rapids, and Lake Winnipeg, Canada; New Jersey.

**CYRTODONTA CANADENSIS** Grabau and Shimer. See *Megalomus canadensis*.

**Cyrtodonta cingulata** (Ulrich).

*Cypricardites cingulata* Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 235, fig. 21.

*Cyrtodonta cingulata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 545, pl. 40, figs. 7, 8.

Black River (Decorah): Minneapolis, Minnesota.

*Holotype*.—Cat. No. 46176, U.S.N.M.

**Cyrtodonta clochensis** Foerste.

*Cyrtodonta clochensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 297, pl. 2, figs. 6a-b.

Black River (Lowville): La Cloche Peninsula, Ontario.

**CYRTODONTA CORDIFORMIS** Billings. See *Plethocardia? cordiformis*.

**Cyrtodonta cuneata** (Miller).

*Angellum cuneatum* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 106, pl. 3, fig. 11; N. A. Geol. Pal., 1889, p. 462, fig. 774.

*Cyrtodonta cuneata* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 999, pl. 45, fig. 2.

Richmond (Whitewater): Richmond, Indiana.

**Cyrtodonta descriptus** (Sardeson).

*Cypricardites descriptus* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 70, pl. 2, fig. 2.

St. Peter: Highland Park, Minnesota.

**Cyrtodonta dignus** (Sardeson).

*Cypricardites dignus* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 71, pl. 2, figs. 4, 5.

St. Peter: South St. Paul, Minnesota.

CYRTODONTA EMMA Billings. See *Rhytimya emma*.

**Cyrtodonta? ferruginea** (Hall and Whitfield).

*Cypricardites ferrugineum* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 116, pl. 5, fig. 11.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 93.  
*Avicula whitfieldi*, Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 558, pl. 37, fig. 5.  
 Upper Medinan (Brassfield): Near Wilmington, Ohio.  
*Plastotype*.—Cat. No. 46544, U.S.N.M.

**Cyrtodonta finitima** (Sardeson).

*Cypricardites finitimus* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 70, pl. 2, fig. 6.  
 St. Peter: Highland Park, Minnesota.

CYRTODONTA GANTHI Safford. See *Modiolodon ganti*.

**Cyrtodonta gibbera** Ulrich.

*Cyrtodonta gibbera* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 542, pl. 39, figs. 13–15.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 162, pl. 13, figs. 34, 36.  
 Trenton: Thirteen miles south of Cannon Falls, Minnesota (Prosser); Baffin Land.  
*Holotype*.—Cat. No. 46177, U.S.N.M.

**Cyrtodonta glabella** (Ulrich).

*Cypricardites glabella* Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota (March), 1892, p. 234, fig. 20.  
*Cyrtodonta glabella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 543, pl. 39, figs. 37, 40.  
*Cypricardites minnesotensis* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3 (April), 1892, p. 338, pl. 6, fig. 21.  
 Black River: Minneapolis, Minnesota (Platteville and Decorah); Beloit, Wisconsin, and Dunleith, Illinois (Platteville).  
*Holotype* and *plesiotype*.—Cat. Nos. 46178–46180, U.S.N.M.

**Cyrtodonta grandis** (Ulrich).

*Cypricardites grandis* Ulrich, Amer. Geol., 6, 1890, p. 387, figs. 19a–c.  
*Cyrtodonta grandis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 547, pl. 40, fig. 11, fig. 43a–i.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 409, fig. 529.  
 Trenton: Between Burgin and Danville, Kentucky; Cannon Falls, Kenyon, etc., Minnesota; Decorah, Iowa; Oshkosh, Wisconsin.  
*Cotypes* and *plesiotypes*.—Cat. Nos. 46182, 46859, U.S.N.M.

**Cyrtodonta grandis germana** (Ulrich).

*Cypricardites germanus* Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 236, fig. 22.  
*Cyrtodonta grandis* var. *germana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 549, pl. 40, figs. 9, 10, 12, fig. 43j.  
 Trenton: Between Burgin and Danville, Kentucky; Cannon Falls, etc., Minnesota; Iowa; Wisconsin.  
*Holotype* and *plesiotype*.—Cat. Nos. 46181, 46862, U.S.N.M.

**Cyrtodonta grandis intermedia** Ulrich.

*Cyrtodonta grandis* var. *intermedia* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 549, fig. 43k.  
 Trenton (Catheys): Haynie's Mill, central Tennessee.  
*Cotype*.—Cat. No. 46183, U.S.N.M.

**Cyrtodonta grandis luculenta** (Sardeson).

*Cypricardites luculentus* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 338, pl. 6, figs. 25, 26.

*Cyrtodonta grandis* var. *luculenta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 549, pl. 40, figs. 13, 14.

Richmond (Maquoketa): Granger, Bristol, etc., Minnesota.

**Cyrtodonta halli** (Nettelroth).

*Cypricardites halli* Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 206, pl. 34, figs. 1-6.

*Cyrtodonta halli* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 541 (gen. ref.).

Richmond: Oldham County, Kentucky.

*Cotypes*.—Cat. No. 51342, U.S.N.M.

**Cyrtodonta? harrietta** Billings.

*Cyrtodonta harrietta* Billings, Pal. Foss., Geol. Surv. Canada, 1865, p. 149, fig. 129 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 13 (loc. ref.).

*Cypricardites harrietta* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Richmond (English Head and Charleton): English Head, Anticosti.

CYRTODONTA HAYNIANA Safford. See *Vanuxemia hayniana*.

CYRTODONTA HINDI Billings. See *Whitella hindi*.

**Cyrtodonta huronensis** Billings.

*Cyrtodonta huronensis* Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 180, figs. 3, 4; Canadian Nat. Geol., 3, 1858, p. 432, figs. 3, 4; Geol. Canada, Geol. Surv. Canada, 1863, p. 147, figs. 102 a, b.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 23, figs. 1-3.

*Palæarca ventricosa* Hall (not Hall, 1847), Pal. New York, 3, 1859, pp. 270, 271, figs. 1-3; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 10, figs. 1-3.

*Cypricardites huronensis* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

*Cypricardites islandicus* Hall in Miller, N. A. Geol. Pal., 1st ed., 1877, p. 189.

*Cyrtodonta subovata* Ulrich, Geol. Minnesota, 3, 1894, p. 536, pl. 39, figs. 28, 29, 31-33?, 30, ?45.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 410, fig. 528a-c.

*Cypricardites subovatus* Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.). Black River: Near Point Palladeau and St. Joseph Island, Lake Huron; Point Claire, island of Montreal, Canada; High Bridge, Kentucky; Tennessee and Virginia (Lowville); St. Paul and Cannon Falls, Minnesota (Decorah).

*Plesiotypes*.—Cat. Nos. 46192, 46849, etc., U.S.N.M. (cotypes of *C. subovata*).

CYRTODONTA HURONENSIS var. SUBCARINATA Chapman. See *Cyrtodonta subcarinata*.

**Cyrtodonta? insularis** Billings.

*Cyrtodonta? insularis* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 14.

*Cypricardites insularis* Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Richmond (English Head): West End, Anticosti.

**Cyrtodonta janesvillensis** Ulrich.

*Cyrtodonta janesvillensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 537, pl. 39, figs. 26, 27.

Black River (Platteville): Janesville and Beloit, Wisconsin.



**Cyrtodonta? lamellosa** Hudson.

*Cyrtodonta? lamellosa* Hudson, Bull. New York State Mus., 80, 1905, p. 287, pl. 4, figs. 10-13.

Chazyan (Valcour): Valcour Island, Lake Champlain.

**Cyrtodonta leucothea** Billings.

*Cyrtodonta Leucothea* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 46, fig. 49 (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 143, fig. 82.

*Cypricardites leucothea* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

**Cyrtodonta normanensis** Safford.

*Cyrtodonta Normanensis* Safford, Geol. Tennessee, 1869, p. 287 (nom. nud.).

Mohawkian: Tennessee.

**Cyrtodonta obesa** Ulrich.

*Cyrtodonta obesa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 542, pl. 39, figs. 10, 11, 12.

Black River: Mercer County, Kentucky; St. Paul and Preston, Minnesota (Decorah).

*Cotypes*.—Cat. Nos. 46184, 46185, U.S.N.M.

**Cyrtodonta obliqua** (Meek and Worthen).

*Cypricardites obliquus* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 311, pl. 2, fig. 9a, b.

*Cyrtodonta obliquus* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 540, p. 39, figs. 35, 36.

Trenton: Scales Mound, Illinois (Galena); Fillmore County, Minnesota (Prosser).

**Cyrtodonta obtusa** (Hall).

*Ambonychia obtusa* Hall, Pal. New York, 1, 1847, p. 167, pl. 36, figs. 8a-b.

*Cyrtodonta obtusa* Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 184, figs. 13, 14; Canadian Nat. Geol., 3, 1858, p. 436, figs. 13, 14; Geol. Canada, Geol. Surv. Canada, 1863, p. 147, fig. 101a, b.

*Posidonomya obtusa* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 177.

*Palaearca obtusa* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 65 (gen. ref.).

*Cypricardites obtusus* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Trenton: Watertown, New York; Canada.

**Cyrtodonta oviformis** (Ulrich).

*Cypricardites oviformis* Ulrich, Amer. Geol., 10, 1892, p. 99, pl. 7, figs. 3, 4.

*Cyrtodonta oviformis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 544, pl. 39, fig. 46; pl. 40, fig. 1.

Black River (Platteville): Janesville, Wisconsin.

*Holotype*.—Cat. No. 46186, U.S.N.M.

**Cyrtodonta parva** Ulrich.

*Cyrtodonta parva* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 541, pl. 39, figs. 24, 25.

Trenton (Prosser): Near Fountain, Minnesota.

*Holotype*.—Cat. No. 46187, U.S.N.M.

**Cyrtodonta persimilis** Ulrich.

*Cyrtodonta persimilis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 544, pl. 39, figs. 41, 44.

*Cypricardites persimilis* Miller, N. A. Geol. Pal., 1897, p. 781 (gen. ref.).

Black River (Platteville): Minneapolis, Minnesota; Beloit, Wisconsin.

*Cotypes*.—Cat. Nos. 46188, 46189, U.S.N.M.

CYRTODONTA? PLEBEIA Billings. See *Whitella plebeia*.

**Cyrtodonta ponderosa** Billings.

*Cyrtodonta ponderosa* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 150 (adv. sheets, 1862).

*Cypricardites ponderosa* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Richmond: Cape Smyth, Manitoulin Island, Lake Huron.

**Cyrtodonta rotulata** Ulrich.

*Cyrtodonta rotulata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 541, pl. 39, figs. 16-19.

Black River: Mercer County, Kentucky; Minneapolis and near Fountain, Minnesota (Decorah).

*Cotypes*.—Cat. Nos. 46190, 46855, U.S.N.M.

**Cyrtodonta rugosa** Billings.

*Cyrtodonta rugosa* Billings, Canadian Nat. Geol., 3, 1858, p. 432, figs. 1, 2; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 179, figs. 1, 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 148, fig. 104a, b.

*Cypricardites rugosus* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Black River: Near Ottawa, Ontario.

**Cyrtodonta saffordi** (Hall).

*Palæarca saffordi* Hall, Pal. New York, 3, 1859, p. 271, figs. 4, 5; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 11, figs. 4, 5,

*Cyrtodonta Saffordi* Safford, Geol. Tennessee, 1869, p. 287, pl. 2 (F), figs. 2a-g.

*Cypricardites saffordi* Hall and Whitfield, Geol. Surv. Ohio, 2, 1875, p. 177, (gen. ref.).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 179, figs.

Trenton (Catheys): Nashville, etc., Tennessee.

*Plesiotype*.—Cat. No. 46191, U.S.N.M.

**Cyrtodonta scala** Raymond.

*Cyrtodonta scala* Raymond, Annals Carnegie Mus., 3, 1906, p. 578.

Chazy (Crown Point): Valcour Island, New York.

CYRTODONTA SIGMOIDEA Billings. See *Whitella? sigmoidea*.

**Cyrtodonta sillimanensis** Ulrich.

*Cyrtodonta sillimanensis* Ulrich, Proc. U. S. Nat. Mus., 22, 1900, p. 162, pl. 13, figs. 31-33.

Mohawkian: Head of Frobisher Bay, Baffin Land.

*Cotypes*.—Cat. No. 28159, U.S.N.M.

**Cyrtodonta solitaria** Raymond.

*Cyrtodonta solitaria* Raymond, Amer. Jour. Sci., 20, 1905, p. 373.

Chazy (Crown Point): Near Tracy Brook, Chazy, New York.

**Cyrtodonta spinifera** Billings.

*Cyrtodonta spinifera* Billings, Canadian Nat. Geol., 3, 1858, p. 435, fig. 12; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 183, fig. 12.

*Cypricardites spinifera* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Black River (Leray): Pauquette Rapids, and Fourth Chute of Bonnechere, Canada.

**Cyrtodonta subangulata** (Hall).

*Edmondia? subangulata* Hall, Pal. New York, 1, 1847, p. 156, pl. 35, fig. 2a, b.

*Palæarca subangulata* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 68 (gen. ref.).

**Cyrtodonta subangulata**—Continued.

*Cyrtodonta subangulata* Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 185; Canadian Nat. Geol., 3, 1858, p. 437.

*Cypricardites subangulatus* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).  
Trenton: Watertown, New York.

**Cyrtodonta subcarinata** Billings.

*Cyrtodonta subcarinata* Billings, Canadian Nat. Geol., 3, 1858, p. 433, figs. 5-7; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 181, fig. 5-7; Geol. Canada, Geol. Surv. Canada, 1863, p. 148, fig. 105.

*Cypricardites subcarinata* Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

*Cyrtodonta Huronensis* var. *subcarinata* Chapman, Canadian Jour., n. s., 7, 1862, p. 117, fig. 112; Expos. Min. Geol. Canada, 1864, p. 120, fig. 112.

Black River: Pointe Claire and Valley of the Ottawa, Canada.

**CYRTODONTA SUBOVATA** Ulrich. See *Cyrtodonta huronensis*.

**CYRTODONTA SUBTRUNCATA** Billings. See *Whitella subtruncata*.

**Cyrtodonta tenella** (Ulrich).

*Cypricardites tenellus* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minn., 1892, p. 237, fig. 23.

*Cyrtodonta tenella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 546, pl. 40, fig. 15-19.  
Black River (Decorah): Six miles south of Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 46193, U.S.N.M.

**CYRTODONTA TRANCEPS** Raymond. See *Endodesma tranceps*.

**CYRTODONTA UNDULOSTRIATA** Grabau and Shimer. See *Cypricardinia undulostriata*.

**CYRTODONTA? UNGULATA** Billings. See *Vanuxemia unguolata*.

**CYRTODONTA WINCHELLI** Safford. See *Modiolodon winchelli*.

**CYRTOGRAPTUS** Carruthers.

Genotype: *C. murchisoni* Carruthers.

*Cyrtograptus* Carruthers, Rep. 37th meeting British Assoc. Adv. Sci., Notes and Abstracts, 1868, p. 57; Geol. Mag., 5, 1868, pp. 73, 127.

*Cyrtograptus* Lapworth, Geol. Mag., dec. 2, 3, 1876, p. 544.—Zittel, Handb. Pal., 1, 1879, p. 297.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 267.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief, 1897, p. 650.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 459.

**Cyrtograptus ulrichi** Ruedemann.

*Cyrtograptus ulrichi* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 459, pl. 29, fig. 4, figs. 442, 443.

Niagaran (Bainbridge): Bainbridge, Cape Girardeau County, Missouri.

*Cotypes*.—Cat. No. 54273, U.S.N.M.

**CYRTOLITES** (part) of authors. See *Oxydiscus* Koken, *Phragmolites* Conrad and *Cyrtolitina* Ulrich.

**CYRTOLITES** Conrad.

Genotype: *C. ornatus* Conrad.

*Cyrtolites* Conrad, Ann. Rep. Nat. Hist. Surv. New York, 1838, p. 118.—Hall (part), Pal. New York, 1, 1847, p. 189 footnote.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 9.—Woodward, Man. Mollusca, pt. 2, 1854, p. 201.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 166.—Hall, 15th Rep. New York State Cab. Nat. Hist., 1862, pl. 11, fig. 19.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 308.—Waagen (part), Pal. Indica (13), pt. 1, 1880, p. 132.—Lind-



**CYRTOLITES**—Continued.

strom, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, pp. 70, 81.—Zittel, Handb. Pal., 2, 1882, p. 185.—Koken, Neues Jahrb. f. Min., Geol., Pal., 6, Beliage-Band, 1889, pp. 393, 467.—Miller, N. A. Geol. Pal., 1889, p. 401.—Matthew, Trans. Royal Soc. Canada, 11, sec. 4, 1894, p. 93.—Koken, Die Leitfossilien, Leipzig, 1896, p. 100; Neues Jahrb. f. Min., Geol., Pal., 1, 1898, p. 4.; Bull. de l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 138.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 846–858.—Pilsbry, Zittel-Eastman Textb. Pal., 1, 1900, p. 445.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 609.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 522.

**CYRTOLITES ACUTUS** Emmons. See *Sinuities cancellata acutus*.

**Cyrtolites carlinatus** Miller.

*Cyrtolites carinatus* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 311, fig. 32; N. A. Geol. Pal., 1889, p. 401, text fig. 667.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 862, pl. 62, figs. 50–52.—Grabau and Shimer, N. A. Index Fossils 1, 1909, p. 610, figs. 815 e–g.

Eden (Southgate): Cincinnati, Ohio, and vicinity.

*Plesiotypes*.—Cat. No. 45783, U.S.N.M.

**CYRTOLITES COMPRESSUS** Hall. See *Phragmolites compressus*.

**Cyrtolites conradi** Hall.

*Cyrtolites conradi* Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 35, fig. 6.

Richmond (Maquoketa): Southwestern Wisconsin.

**CYRTOLITES COSTATUS** James. See *Dyeria costata*.

**CYRTOLITES CRISTATUS** Safford. See *Oxydiscus cristatus*.

**CYRTOLITES DESIDERATUS** Billings. See *Phragmolites desideratus*.

**Cyrtolites? dilatatus** Ulrich and Scofield.

*Cyrtolites(?) dilatatus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 865, pl. 62, figs. 20–26.

Black River (Decorah): Goodhue County, Minnesota; Beloit, Wisconsin.

*Cotype*.—Cat. No. 45784, U.S.N.M.

**Cyrtolites disjunctus** Ulrich and Scofield.

*Cyrtolites disjunctus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 864, pl. 62, figs. 48, 49.

Richmond (Maquoketa): Near Spring Valley, Minnesota.

*Holotype*.—Cat. No. 45785, U.S.N.M.

**CYRTOLITES DYERI** of authors. See *Phragmolites dyeri* and *P. elegans*.

**CYRTOLITES DYERI** var. **CELLULOSA** Ulrich and Scofield. See *Phragmolites dyeri* *cellulosus*.

**CYRTOLITES ELEGANS** Miller. See *Phragmolites elegans*.

**CYRTOLITES FILOSUS** Hall. See *Cyrtoceras filiosum*.

**CYRTOLITES FIMBRIATUS** Miller. See *Phragmolites fimbriatus*.

**CYRTOLITES IMBRICATUS** Meek and Worthen. See *Phragmolites imbricatus*.

**CYRTOLITES (MICROCERAS) INORNATUS** Meek. See *Microceras inornatum*.

**CYRTOLITES MAGNUS** Miller. See *Oxydiscus magnus*.

**CYRTOLITES NITIDULUS** Ulrich. See *Cyrtolitina nitidula*.

**Cyrtolites ornatus** Conrad.

*Cyrtolites ornatus* Conrad, Ann. Geol. Rep. New York, 1838, p. 118; *ibid.*, 1839, p. 63; *ibid.*, 1841, p. 37.—Vanuxem, Nat. Hist. New York, Geol. Rep., 3, 1842, pp. 64, 65, fig. 2.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 376, fig. 2.—Hall Pal. New York, 1, 1847, p. 308, pl. 84, figs. 1a-g.—Billings, Canadian Nat. Geol., 1, 1856, p. 43, fig. 6.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 820, fig. 619.—Chapman, Canadian Jour., new ser., 7, 1862, p. 119, fig. 119; 8, 1863, p. 206, fig. 207.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 217, fig. 226.—Chapman, Expos. Min. Geol. Canada, 1864, p. 123, fig. 119; p. 178, fig. 207.—Meek, Pal. Ohio, 1, 1873, p. 148, pl. 13, figs. 3a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 308.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 5, fig. 8a.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 182, figs.—Miller, N. A. Geol. Pal., 1889, p. 402, fig. 669.—Koken, Neues Jahrb. f. Min., Geol., Pal., 6, Beilage-Band, 1889, p. 483, pl. 13, fig. 3.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 860, pl. 62, figs. 27-29.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 962, pl. 40, figs. 8, 8a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 609, fig. 815a, b.

*Porcelia ornata* Sharpe, Quart. Jour. Geol. Soc. London, 4, 1847, p. 181.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 167, pl. 17, fig. 21; Man. Geology, 1860, p. 102, fig. 7 only.

Maysville and Richmond: Oswego County, etc., New York (Pulaski); Canada; Pennsylvania to Alabama; Ohio Valley; etc.

*Plesiotypes*.—Cat. Nos. 17898, 45786, U.S.N.M.

**Cyrtolites ornatus minor** Ulrich and Scofield.

*Cyrtolites ornatus* var. *minor* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 860, pl. 62, figs. 30-31.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 174, pl. 12, figs. 6, 7.

Trenton: Cannon Falls, Minnesota (Prosser); New Jersey.

*Holotype*.—Cat. No. 45787, U.S.N.M.

**CYRTOLITES PANNOSUS** Billings. See *Phragmolites pannosus*.

**Cyrtolites parvus** Ulrich.

*Cyrtolites parvus* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 864, pl. 62, figs. 45-47.

Trenton (Upper): Covington, Kentucky.

*Holotype*.—Cat. No. 45788, U.S.N.M.

**Cyrtolites retrorsus** Ulrich and Scofield.

*Cyrtolites retrorsus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 861, pl. 62, figs. 32-37.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 610, fig. 815c, d.

Trenton: Near Burgin, Covington, etc., Kentucky; Nashville, etc., Tennessee.

*Cotypes*.—Cat. Nos. 45789, 45790, U.S.N.M.

**Cyrtolites retrorsus fillmorensis** Ulrich and Scofield.

*Cyrtolites retrorsus* var. *fillmorensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 862, pl. 62, figs. 38, 39.

Black River (Decorah): Chatfield and near Fountain, Minnesota; Lincoln County, Missouri.

*Cotypes*.—Cat. No. 45791, U.S.N.M.

**Cyrtolites sinuatus** Hall and Whitfield.

*Cyrtolites sinuatus* Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 237, pl. 1, figs. 23, 24.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 127, pl. 4, fig. 9.

Ordovician: White Pine District, Nevada (Upper Pogonip); Columbia, New Jersey (Beekmantown).

*Holotype*.—Cat. No. 17363, U.S.N.M.

**Cyrtolites sinuosus** Hall.

*Cyrtolites sinuosus* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 30, figs. 16–18; mus. ed., 1879, p. 178, pl. 30, figs. 16–18; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 321, pl. 31, figs. 16–18.

Niagaran (Waldron): Waldron, Indiana.

**CYRTOLITES SUBACUTUS** Miller. See *Oxydiscus subacutus*.

**CYRTOLITES SUBCARINATUS** Emmons. See *Carinaropsis carinata*.

**CYRTOLITES SUBCOMPRESSUS** Meek. See *Microceras inornatum*.

**Cyrtolites subplanus** Ulrich.

*Cyrtolites subplanus* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 846, pl. 62, figs. 40–44.

Trenton (Catheys): Nashville, Tennessee.

*Cotypes*.—Cat. No. 45792, U.S.N.M.

**CYRTOLITES TRENTONENSIS** Conrad. See *Eccyliomphalus trentonensis*.

**Cyrtolites youngi** Foerste.

*Cyrtolites Youngi* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 289, pl. 6, fig. 7; Geol. Surv. Ohio, Pal., 8, 1893, p. 549, pl. 31, figs. 7, 7a.

Upper Medinan (Brassfield): Hanover, Indiana.

**CYRTOLITINA** Ulrich.

Genotype: *Cyrtolites lamellifer* Lindström.

*Cyrtolites* Ulrich (part), Jour. Cin. Soc. Nat. Hist., 2, 1879, p. 12.—Lindström, Silurian Gastropoda of Gotland, 1884, pp. 82–84.

*Cyrtolitina* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pp. 847–866.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 521.

**Cyrtolitina nitidula** (Ulrich).

*Cyrtolites nitidulus* Ulrich, Jour. Cin. Soc. Nat. Hist., 2, 1879, p. 12, pl. 7, figs. 7, 7a.

*Cyrtolitina nitidula* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 866, pl. 62, figs. 53–55.

Trenton (Upper): River quarries, Covington, Kentucky.

*Holotype*.—Cat. No. 45793, U.S.N.M.

**CYRTOMETOPUS SCOFIELDI** Clarke. See *Ceraurinus scofieldi*.

**CYRTORIZOCERAS** Hyatt.

Genotype: *Cyrtoceras minneapolis* Clarke.

*Cyrtorizoceras* Hyatt, Zittel-Eastman Textb. Pal., 1900, p. 529; *ibid*, 2d ed., 1913, p. 610.

**Cyrtorizoceras curvicameratum** Clarke and Ruedemann.

*Cyrtorizoceras curvicameratum* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 90, pl. 17, figs. 1–10.

Niagaran (Lockport-Guelph): Shelby, New York.



**Cyrtorhizoceras dardanum** (Hall).

*Cyrtoceras dardanum* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 43; 20th Rep. New York State Cab. Nat. Hist., 1868 (extras Jan., 1865), p. 349, pl. 17(8), figs. 3-5; rev. ed., 1870, p. 406, pl. 17, figs. 3-5.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 506, pl. 25, figs. 6a, b.

*Cyrtoceras Fultonensis* Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 506.

*Cyrtorhizoceras dardanus* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 91 (gen. ref.).

Niagaran: Waukesha, Wisconsin (Racine); Fulton City, Illinois.

**Cyrtorhizoceras fosteri** (Hall).

*Cyrtoceras fosteri* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 41.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 102.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras Jan., 1865), p. 349, pl. 16(7), figs. 11-13; rev. ed., 1870, p. 406, pl. 16, figs. 11-13.

*Cyrtorhizoceras fosteri* Clarke and Ruedemann, New York State Mus., 5, 1903, p. 91 (gen. ref.).

Niagaran (Racine): Chicago, Illinois; Wisconsin.

**Cyrtorhizoceras isodorus** (Billings).

*Cyrtoceras Isodorus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 175, fig. 157a, b.

Black River: St. Joseph Island, Lake Huron.

**Cyrtorhizoceras minneapolis** (Clarke).

*Cyrtoceras minneapolis*, Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 808, pl. 59, figs. 1-8.

*Cyrtorhizoceras minneapolis* Hyatt, Zittel-Eastman Textb. Pal., 1900, p. 529 (gen. ref.).

Black River (Platteville): Minneapolis, Minnesota.

*Cotype*.—Cat. No. 46525, U.S.N.M.

**CYRTOSPIRA** Ulrich.

Genotypes: *C. tortilis* Ulrich and *Subulites ventricosus* Hall.

*Cyrtospira* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1073.

**Cyrtospira abbreviata** (Hall).

*Subulites abbreviata* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 180, pl. 3, fig. 2a-c; doc. ed., p. 172.

*Cyrtospira abbreviata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070 (gen. ref.).

Trenton: Near Watertown, New York.

**Cyrtospira attenuata** Ruedemann.

*Cyrtospira attenuata* Ruedemann, Bull. New York State Mus., 49, 1901, p. 35, pl. 2, fig. 8.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Cyrtospira bicurvata** Ulrich.

*Cyrtospira bicurvata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1074, pl. 81, figs. 21, 22.

Black River (Lowville): High Bridge, Kentucky.

*Holotype*.—Cat. No. 45794, U.S.N.M.

**Cyrtospira notata** (Billings).

*Subulites notatus* Billings, Cat. Sil. Fossils, Anticosti, Geol. Surv. Canada, 1866, p. 54.

*Cyrtospira notatus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070, (gen. ref.).

Anticostian (Ellis Bay): Junction Cliff, Anticosti.

**Cyrtospira parvulus** (Billings).

*Subulites parvulus* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 36 (adv. sheets, 1862).

*Cyrtospira parvulus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070 (gen. ref.).

Black River (Leray): Pauquette Rapids, Ottawa River and near L'Original, Canada.

**Cyrtospira raymondi** (Hudson).

*Subulites raymondi* Hudson, Bull. New York State Mus., 80, 1905, p. 293, pl. 4, figs. 1, 2.

*Cyrtospira raymondi* Raymond, Ann. Carnegie Mus., 4, 1908, p. 210, pl. 54, figs. 14, 15.

Chazy (Crown Point, Valcour): Valcour Island and Chazy, New York.

**Cyrtospira tortilis** Ulrich.

*Cyrtospira tortilis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1074, pl. 81, figs. 24, 25.

*Subulites tortilis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 770 (gen. ref.).

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Holotype*.—Cat. No. 46053, U.S.N.M.

**Cyrtospira ventricosa** (Hall).

*Subulites ventricosa* Hall, Pal. New York, 2, 1852, p. 347, pl. 83, fig. 7a, b.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 339, fig. 346.—Hall, 20th Rep. New York State Cab. Hist., 1868, p. 346, pl. 15 (6), fig. 1; rev. ed. (1870), p. 398, pl. 15, fig. 1; p. 433.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 71, pl. 3, fig. 5; Quart. Jour. Geol. Soc. London, 31, 1875, p. 549, pl. 26, fig. 5.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 193, pl. 15, figs. 19–21; pl. 18, fig. 58, 59.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1890, p. 1144, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 96.

*Cyrtospira ventricosa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1073 (gen. ref.).—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 338.

Niagaran (Guelph): Gault, etc., Ontario; Wisconsin.

**Cyrtospira wykoffensis** Ulrich and Scofield.

*Cyrtospira wykoffensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1074, pl. 81, fig. 23.

*Subulites wykoffensis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 770 (gen. ref.).

Trenton (Prosser): Wykoff, Minnesota.

*Holotype*.—Cat. No. 45795, U.S.N.M.

**CYRTOTHECA CORRUGATA** Matthew. See *Styliola corrugata*.

**CYRTOTHECA MINUTA** Matthew. See *Styliola minuta*.

**CYSTASTER** Hall. See *Hemicystites* Hall.

**CYSTIPHOROLITES** Miller.Genotype: *Vesicularia major* Rominger.*Vesicularia* Rominger (not Thompson), Geol. Surv. Michigan, 3, pt. 2, 1876, p. 135.*Cystiphorolites* Miller, N. A. Geol. Pal., 1889, p. 183.—Sherzer, Amer. Geol., 7, 1891, pp. 296–301.**Cystiphorolites major** (Rominger).*Vesicularia major* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 135, pl. 49, upper tier.*Cystiphorolites major* Miller, N. A. Geol. Pal., 1889, p. 183 (gen. ref.).

Niagaran: Point Detour; Drummonds Island, Michigan.

**Cystiphorolites minor** (Rominger).*Vesicularia minor* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 136, pl. 49, upper tier.*Cystiphorolites minor* Miller, N. A. Geol. Pal., 1889, p. 183 (gen. ref.).

Niagaran: Masonville, Iowa.

**Cystiphorolites variolosus** (Rominger).*Vesicularia variolosa* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 136, pl. 49, fig. 4.*Cystiphorolites variolosa* Miller, N. A. Geol. Pal., 1889, p. 183 (gen. ref.).

Niagaran: Point Detour, Michigan.

**CYSTIPHYLLUM** Lonsdale.Genotype: *C. siluriense* Lonsdale.*Cystiphyllum* Lonsdale in Murchison's Sil. Syst., 1839, p. 691.—Dana, Wilkes'

U. S. Expl. Exped., 1838–1842, 7, Zoophytes, 1846, p. 360; Amer. Jour. Sci. Arts (2), 1, 1846, p. 186.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr., Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 175, 462.—McCoy, British Pal. Rocks Foss., 1854, p. 32.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 462.—Billings, Geol. Surv. Canada, Rep. Progr. for 1857, p. 178; Canadian Nat. Geol., 3, 1858, p. 430; Canadian Jour., n. s., 4, 1859, p. 136.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 447.—Lindstrom, Geol. Mag., 3, 1866, p. 359.—Dybowski, Archiv. f. Naturf. Liv-, Ehst- und Kurl., 5, 1873, pp. 340, 522.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 35.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 137.—Zittel, Handb. Pal., 1, Munich, 1879, p. 234.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 399.—Frech, Pal. Abh., Dames and Kayser, bd. 3, Heft 3, 1886, p. 108.—Miller, N. A. Geol. Pal., 1889, p. 183.—Frech, Palaeontographica, 37, 1890, p. 43.—Sherzer, Amer. Geol., 7, 1891, pp. 277, 296–301.—Koken, Die Leitfossilien, Leipzig, 1896, p. 312.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 126.—Zittel-Eastman Textb. Pal., 1, 1900, p. 79.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 190.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 160.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 87.

*Conophyllum* Hall, Pal. New York, 2, 1852, p. 114; Amer. Jour. Sci. and Arts, 2d ser., 11, 1851, p. 399 (Genotype: *C. niagarense* Hall).**Cystiphyllum americanum anderdonense** Grabau.*Cystiphyllum americanum* mut. *anderdonense* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 104, pl. 12, figs. 3–5.

Upper Monroan: Detroit River region (Amherstburg); Amherstburg, Ontario (Anderdon).

**Cystiphyllum gemmula** Greene.*Cystiphyllum gemmula* Greene, Cont. Indiana Pal., pt. 2, 1899, p. 12, pl. 6, figs. 8, 9.

Niagaran (Louisville): Louisville, Kentucky.



**Cystiphyllum granilineatum** Hall.

*Cystiphyllum granilineatum* Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 274, pl. 15, fig. 13; pl. 23, fig. 13; 35th Rep. New York State Mus. Nat. Hist., p. 418 (ext., 1882, p. 14).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 184, figs.

Niagaran (Louisville): Louisville, Kentucky.

**CYSTIPHYLLUM HURONENSE** Billings. See *Cystiphyllum niagarense*.

**Cystiphyllum incurvum** Davis.

*Cystiphyllum incurvum* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 124, figs. 6-8:

Niagaran (Louisville): Louisville, Kentucky.

**Cystiphyllum lineatum** Davis.

*Cystiphyllum lineatum* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 128, figs. 1-4.

Niagaran (Louisville): Louisville, Kentucky.

**Cystiphyllum louisvillense** Greene.

*Cystiphyllum louisvillensis* Greene, Cont. Indiana Pal., 1, pt. 6, 1901, p. 45, pl. 16 figs. 7-10.

Niagaran (Louisville): Louisville, Kentucky.

**Cystiphyllum maritimum** Billings.

*Cystiphyllum maritima* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 112 (adv. sheets, 1862).—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 191, pl. 18, figs. 2, 2a.

Silurian: L'Anse a la Vieille, Bay of Chaleurs, Quebec.

**Cystiphyllum niagarense** (Hall).

*Chonophyllum niagarense* Hall, Pal. New York, 2, 1852, p. 114, pl. 32, fig. 4a-n.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Miller, N. A. Geol. Pal., 1889, p. 177, fig. 150.—Sherzer, Bull. Geol. Soc. Amer., 3, 1892, p. 266.—Grabau, Bull. New York State Mus., 45, 1901, p. 139, fig. 32.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 62, fig. 92.

*Cystiphyllum Niagarense* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 138, pl. 49, fig. 3.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 124, figs. 1-5.—Lambe, Ottawa Nat., 12, 1899, p. 224; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 190, pl. 16, fig. 7.

*Cystiphyllum Huronense* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 92.

Niagaran: Lockport, etc., New York (Lockport); Louisville, Kentucky (Louisville); Drummond Island, etc., Lake Huron; Wisconsin; Anticosti.

**Cystiphyllum spinulosum** Foerste.

*Cystiphyllum spinulosum* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 321, pl. 5, figs. 1a-k.

Clinton (Waco): Near Estill Springs, Waco and Panola, Kentucky.

**CYSTOCRINUS** Roemer.

Genotype: *C. tennesseensis* Roemer.

*Cystocrinus* Roemer, Silur. Fauna West Tennessee, 1860, p. 56.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 404 (Rev. Pal., pt. 2, p. 230).—Miller, N. A. Geol. Pal., 1889, p. 237.

**Cystocrinus tennesseensis** Roemer.

*Cystocrinus tennesseensis* Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 56, pl. 4, figs. 8a-d.—Miller, N. A. Geol. Pal., 1889, p. 237, fig. 279.—Bather, Geol. Mag., dec. 4, 5, 1898, p. 327, fig. 2.—Foerste, Jour. Geol., 11, 1903, p. 712.

Niagaran (Brownsport): Decatur and Perry Counties, Tennessee.

**CYSTOSTYLUS** Whitfield.

Genotype: *C. typicus* Whitfield.

*Cystostylus* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1879, 1880, p. 63; Geol. Wisconsin, 4, 1882, p. 273.—Miller, N. A. Geol. Pal., 1889, p. 184.—Sherzer, Amer. Geol., 8, 1891, pp. 296-301.

**Cystostylus infundibulus** (Whitfield).

*Syringopora infundibula* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 79.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 53.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 35, pl. 1, figs. 6-9.

*Cystostylus infundibulus* Whitfield, Geol. Wisconsin, 4, 1882, p. 274, pl. 14, fig. 7.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 188, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 2 (loc. occ.); *ibid.*, pt. 2, 1895, p. 49 (loc. occ.).

Niagaran: Milwaukee and Wauwatosa, Wisconsin (Racine); Durham, Ontario, and Shelby, New York (Guelph).

**Cystostylus typicus** Whitfield.

*Cystostylus typicus* Whitfield, Ann. Rep. for 1879, Wisconsin Geol. Surv., 1880, p. 64; Geol. Wisconsin, 4, 1882, p. 274, pl. 14, figs. 8, 9.

Niagaran (Racine-Waukesha): Cato and Sturgeon Bay, Wisconsin.

**CYTHERE BALTICA** Roemer. See *Leperditia hisingeri*.

**CYTHERE CINCINNATIENSIS** Meek. See *Elpe cincinnatiensis*.

**CYTHERE IRREGULARIS** Miller. See *Elpe irregularis*.

**CYTHERE SUBLÆVIS** Shumard. See *Leperditia sublævis*.

**CYTHERELLA** Jones.

Genotype: *C. ovata* (Roemer).

*Cytherella* Jones, Mon. Entom. Cret. Form., 1848, p. 28.—Bosquet, Desc. Entom. Foss. Terr. Tert., 1852, p. 10.—Bonnemann, Zeits. d. d. geol. Gesell., 7, 1855, p. 353.—Richter, Zeits. d. d. geol. Gesell., 19, 1867, p. 226.—Jones, Kirkby, and Brady, Mon. Brit. Foss. Biv. Entom. Carb. Form., Pal. Soc., 1874, p. 6; *ibid.*, 1884, p. 57, 70.—Zittel, Handb. Pal., 1885, p. 556.—Jones and Kirkby, Proc. Geol. Assoc. London, 9, 1886, p. 502.—Jones, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 192.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 4, pl. 2, fig. 4.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 707.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 684.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40.—Zittel-Eastman Textb. Pal., 1, 1900, p. 646.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 366.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 740.

**Cytherella? rugosa** (Jones).

*Cytheropsis rugosa* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 249, pl. 10, fig. 5; Geol. Surv. Canada, dec. 3, 1858, p. 100.

*Primitia rugosa* Jones and Holl, Ann. Mag. Nat. Hist., 4th ser., 2, 1868, p. 55, footnote (gen. ref.).

**Cytherella? rugosa**—Continued.

*Cytherella? rugosa* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 99 (gen. ref.).—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 686, pl. 43, figs. 21–24.—

Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 366, fig. 1666, t, u.

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

Trenton (Prosser): Near Cannon Falls, Minnesota.

*Plesiotypes*.—Cat. No. 41814, U.S.N.M.

**Cytherella? rugosa arcta** Ulrich.

*Cytherella? rugosa* var. *arcta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 686, pl. 43, fig. 25.

Trenton (Prosser): Near Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 41815, U.S.N.M.

**Cytherella? subrotunda** Ulrich.

*Cytherella? subrotunda* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 685, pl. 44, fig. 43.

Black River (Decorah): Minneapolis, Minnesota.

**CYTHERINA ALTA** Conrad. See *Leperditia alta* and *L. jonesi*.

**CYTHERINA BALTHICA** Hisinger (part). See *Leperditia hisingeri*.

**CYTHERINA CRENULATA** Emmons. See *Cytheropsis crenulata*.

**CYTHERINA CYLINDRICA** Hall. See *Leperditia cylindrica*.

**CYTHERINA EMMONSI** Vogdes. See *Cytheropsis emmonsi*.

**CYTHERINA FABULITES** Conrad. See *Leperditia fabulites*.

**CYTHERINA PHASEOLUS** Hisinger. See *Leperditia phaseolus*.

**CYTHERINA SPINOSA** Hall. See *Æchmina spinosa*.

**CYTHERINA SUBCYLINDRICA** Emmons. See *Cytheropsis emmonsi*.

**CYTHERINA SUBELLIPTICA** Emmons. See *Cytheropsis subelliptica*.

**CYTHERODON** Hall.

Genotype: *C. nasutus* Hall.

*Cytherodon* Hall, 23d Rep. New York State Cab. Nat. Hist., 1873, pl. 14, figs. 19–21; Pal. New York, 5, pt. 1, Lam. 2, 1885, p. 53.—Miller, N. A. Geol. Pal., 1889, p. 477.

**Cytherodon? placidus** Billings.

*Cytherodon? placidus* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 137, pl. 8, fig. 10 (var. pl. 8, fig. 11).

Silurian: Arisaig, Nova Scotia.

**Cytherodon? socialis** Billings.

*Cytherodon? socialis* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 138, pl. 8, fig. 12.

Silurian: Arisaig, Nova Scotia.

**CYTHEROPSIS** McCoy.

Genotype: *C. aldensis* McCoy.

*Cytheropsis* McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 414; Cont. British Pal., 1854, p. 153; Synopsis British. Pal. Rocks., 1855, pl. 1 L, fig. 2.—Jones, Ann. Mag. Nat. Hist. (3), 1, 1858, p. 248; Geol. Surv. Canada, dec. 3, 1858, p. 98.—Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 508.—Miller, N. A. Geol. Pal., 1889, p. 541.



**CYTHEROPSIS CININNATIENSIS** Miller. See *Elpe cincinnatiensis*.

**CYTHEROPSIS CONCINNA** Jones. See *Aparchites concinnus* and *Primitia muta*.

**Cytheropsis crenulata** (Emmons).

*Cytherina crenulata* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 220, figs. 75d, c.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 187, figs.

*Cytheropsis crenulata* Miller, N. A. Geol. Pal., 1889, p. 541 (gen. ref.).

Trenton: Middleville, New York.

**Cytheropsis emmonsii** (Vogdes).

*Cytherina subcylindrica* Emmons (preoccupied), Amer. Geology, 1, pt. 2, 1855, p. 220, fig. 75b.

*Cytheropsis subcylindrica* Miller, N. A. Geol. Pal., 1889, p. 542 (gen. ref.).

*Cytherina emmonsii* Vogdes, Annals New York Acad. Sci., 5, 1889, p. 13k.

Trenton: Middleville, New York.

**CYTHEROPSIS IRREGULARIS** Miller. See *Elpe irregularis*.

**CYTHEROPSIS RUGOSA** Jones. See *Cytherella? rugosa*.

**CYTHEROPSIS SILIQUA** Jones. See *Macrocypris? siliqua*.

**CYTHEROPSIS SUBCYLINDRICA** Emmons. See *Cytheropsis emmonsii*.

**Cytheropsis subelliptica** (Emmons).

*Cytherina subelliptica* Emmons, Amer. Geology, 1, 1855, p. 220, fig. 75a.

*Cytheropsis subelliptica* Miller, N. A. Geol. Pal., 1889, p. 542 (gen. ref.).

Trenton: Near Watertown, New York.

**CYTOCRINUS** Roemer. See *Melocrinus* Goldfuss.

**DACTYLOPHYCUS** Miller and Dyer.

Genotype: *D. tridigitatum* Miller and Dyer.

*Dactylophycus* Miller and Dyer, Cont. to Pal., 2, 1878, p. 1.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 164.—Miller, N. A. Geol. Pal., 1889, p. 116.

**Dactylophycus quadripartitum** Miller and Dyer.

*Dactylophycus quadripartitum* Miller and Dyer, Cont. to Pal., 2, 1878, p. 2, pl. 3, fig. 1.

Eden (Economy): Cincinnati, Ohio, and vicinity.

**Dactylophycus tridigitatum** Miller and Dyer.

*Dactylophycus tridigitatum* Miller and Dyer, Cont. to Pal., 2, 1878, p. 2, pl. 3, fig. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 164.—Miller, N. A. Geol. Pal., 1889, p. 116, fig. 29.

Eden (Economy): Cincinnati, Ohio, and vicinity.

**DÆDALUS** Rouault.

Genotype: *D. newtoni* Rouault.

*Dædalus* Rouault, Bull. Soc. Geol. France, 2d ser., 7, 1850, p. 736.—Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 247.

*Vexillum* Rouault, Bull. Soc. Geol. France, 2d ser., 7, 1850, p. 733 (Genotype: *V. labechei* Rouault).

**Dædalus archimedes** (Ringueberg).

*Arthrophycus* sp. Hall, Pal. New York, 2, 1852, p. 6, pl. 2, fig. 2.

*Spirophyton archimedes* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 144, pl. 2, fig. 1.

*Taonurus archimedes* Miller, N. A. Geol. Pal., 1889, p. 146 (gen. ref.).

**Dædalus archimedes**—Continued.

*Dædalus archimedes* Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 248.

Upper Medinan: Lockport, etc., New York; Pennsylvania; Maryland; Virginia; Tennessee.

**DALMANELLA** Hall and Clarke.Genotype: *Orthis testudinaria* Dalman.

*Orthis* (group of *O. testudinaria*) Hall, Bull. Geol. Soc. Amer., 1, 1889, p. 21.

*Dalmanella* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 205, 223.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 439.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 170.—Wysogorski, Zeits. d. d. geol. Gesell., 52, 1900, p. 225.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 187; Bull. New York State Mus., 45, 1901, p. 187.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 259.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 888.

**DALMANELLA** *AMENA* Schuchert. See *Pianodema amena*.

**Dalmanella arcuaria** Hall and Clarke.

*Dalmanella arcuaria* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 224, 341, pl. 5C, figs. 20, 21.—Foerste, Jour. Geol., 11, 1900, p. 711 (loc. occ.).

*Orthis* (*Dalmanella*) *arcuaria* Hall and Clarke, 48th Rep. New York State Mus. for 1895, 2, 1897, p. 340, pl. 4, figs. 13, 14; 14th Rep. State Geol. New York for 1894, 1897, p. 340, pl. 4, figs. 13, 14.

Niagaran (Brownsport): Perry County, Tennessee.

**Dalmanella bassleri** Foerste.

*Dalmanella bassleri* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 215.

Trenton (Upper): Carnestown, etc., Kentucky; Florence, Indiana.

**DALMANELLA** *BELLULA* Hall and Clarke. See *Pianodema bellula*.

**DALMANELLA** *BREVICULUS* Foerste. See *Dalmanella emacerata brevicula*.

**Dalmanella centrilineata** (Hall).

*Orthis centrilineata* Hall, Pal. New York, 1, 1847, p. 289, pl. 79, fig. 5.

*Dalmanella centrilineata* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 260. Cincinnati (Pulaski): Lorraine and Turin, New York.

**Dalmanella clarki** Maynard.

*Dalmanella clarki* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 300, pl. 54, figs. 7-10.

Helderbergian (Keyser): Cash Valley, Maryland.

**Dalmanella concinna** (Hall).

*Orthis concinna* Hall, Pal. New York, 3, 1859, p. 172, pl. 10a, figs. 1-3.

*Dalmanella concinna* Hall and Clarke, Pal. New York, 8, 1892, pt. 1, pp. 207, 224.—Maynard, Maryland Geol. Surv., Low Dev., 1913, p. 301, pl. 54, figs. 11-13.

Helderbergian (Keyser): Cumberland, etc., Maryland; Keyser, West Virginia; Pleasant Valley and Hyndman, Pennsylvania.

**Dalmanella corpulenta** (Sardeson).

*Orthis corpulenta* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 330, pl. 5, figs. 8-10; Amer. Geol., 19, 1897, p. 101, pl. 4, figs. 11-19.

*Orthis* (*Dalmanella*) *testudinaria* var. *meeki* Winchell and Schuchert (not Miller), Geol. Minnesota, 3, 1893, p. 445, pl. 23, figs. 25-29.

Richmond (Maquoketa): Granger and Spring Valley, Minnesota.



*DALMANELLA CRISPATA* Hall and Clarke. See *Hebertella* (*Glyptorthis*) *crispata*.

***Dalmanella edgewoodensis* Savage.**

*Dalmanella edgewoodensis* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 76, pl. 4, figs. 11-13, pl. 7, fig. 9.

Upper Medinan: Near Thebes, Illinois; Missouri (Edgewood); Will County, Illinois (Channahon).

***Dalmanella electra* (Billings).**

*Orthis Electra* Billings, Pal. Fossils, 1, 1865, p. 79, fig. 72; p. 217; Geol. Canada, 1863, p. 231, fig. 246.—White, Wheeler's Rep. Geol. Geogr. Expl. west 100 Merid., 4, 1875, p. 55.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 513, figs.

*Dalmanella electra* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 223.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 125, pl. 4, fig. 13.

Canadian: Point Levis, Quebec; Point Rich, etc., Newfoundland; St. John, New Brunswick; House Range, Utah; Columbia, New Jersey.

***Dalmanella electra laevis* (Matthew).**

*Orthis electra* var. *laevis* Matthew, Trans. Royal Soc. Canada, 10, 1893, p. 100.

*Dalmanella electra laevis* Schuchert, Bull. U. S. Geol. Surv., 87, 1899, p. 200.

Canadian (Bretonian—Div. C 3d): St. John, New Brunswick.

***Dalmanella electra major* (Matthew).**

*Orthis electra* var. *major* Matthew, Trans. Royal Soc. Canada, 10, 1893, p. 100, pl. 7, fig. 3.

*Dalmanella electra major* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 200.

Canadian (Bretonian—Div. C 3d): St. John, New Brunswick.

***Dalmanella elegantula* (Dalman).**

*Orthis elegantula* Dalman, Kongl. Svenska Vet.-Akad. Handl., 1828, p. 117, pl. 2, fig. 6.—Hall, Pal. New York, 2, 1852, p. 252, pl. 52, fig. 3.—Billings, Canadian Nat. Geol., 1, 1856, p. 136, pl. 2, fig. 5.—Roemer, Sil. Fauna West Tennessee, 1860, p. 62, pl. 5, fig. 7.—Billings, Geol. Canada, 1863, p. 312, fig. 320.—Chapman, Canadian Jour., n. s., 8, 1863, p. 212, fig. 218; Expos. Min. Geol. Canada, 1864, p. 184, fig. 218.—Davidson, Mon. British Sil. Brach., Pal. Soc., 1869, p. 205, figs. 1, 2; p. 211, pl. 27, figs. 1-9.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 150, pl. 21, figs. 11-17; 11th Rep. State Geol. Indiana, 1882, p. 285, pl. 21, figs. 11-17; 2d Ann. Rep. State Geol., 1883, pl. 35, figs. 34-37; 36th Rep. New York State Mus. Nat. Hist., 1884, p. 75, pl. 3, figs. 8, 9.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 84, pl. 13, fig. 1.—Miller, N. A. Geol. Pal., 1889, p. 357, fig. 590.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 514, figs.—Nettelroth, Kentucky Foss. Shells, Mem. Kentucky Geol. Surv., 1889, p. 37, pl. 32, figs. 52-57.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 14, pl. 1, figs. 3-12.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 307.

*Orthis canalis* Hall, Geol. New York, Rep. 4th Dist., 1843, p. 105, fig. 6.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 313, fig. 6.—Emmons, Man. Geol., 1860, p. 109, fig. 99.

*Orthis elegantula?* var. Hall, Pal. New York, 2, 1852, p. 57, pl. 20, fig. 7.

*Dalmanella elegantula* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 207, 224, pl. 5C, figs. 15-19.—Grabau, Bull. New York State Mus., 45, 1901, p. 187, fig. 97; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 187, fig. 97.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 41, pl. 4, fig. 9.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 433, pl. 2, fig. 9.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 261, fig. 312.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 27.



**Dalmanella elegantula**—Continued.

*Orthis* (*Dalmanella*) *elegantula* Foerste, Geol. Ohio, 7, 1895, p. 581, pl. 25, figs. 11, 17.

Silurian: Europe. Widely distributed in all of the post-Richmond Silurian formations of eastern North America.

*Plesiotypes*.—Cat. No. 51345, U.S.N.M. (Nettelroth.)

**Dalmanella elegantula media** (Shaler).

*Orthis media* Shaler, Bull. Mus. Comp. Zool., 1, 1865, p. 65.—Billings, Cat. Sil. Fossils of Anticosti, 1866, p. 41.

*Rhipidomella media* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 349.

Anticostian (Jupiter River and Chicotte): Southwest Point, etc., Anticosti.

**Dalmanella elegantula parva** (Foerste).

*Orthis elegantula* var. *parva* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 85, pl. 13, fig. 17.

*Dalmanella elegantula* var. *parva* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 224.

Upper Medinan (Brassfield): Dayton, Ohio.

*DALMANELLA EMACERATA* Foerste (1909). See *Dalmanella fultonensis*.

**Dalmanella emacerata** (Hall).

*Orthis emacerata* Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 121; 15th Rep. *ibid.*, 1862, pl. 2, figs. 1, 3.—Billings, Canadian Nat. Geol., 7, 1862, p. 393.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 24,—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 14, 15.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 515, figs.—Keyes, Geol. Surv. Missouri, 5, 1895, p. 58.—Sardeson, Amer. Geol., 19, 1897, p. 102, pl. 5, figs. 14, 18, 28.

*Orthis cycilus* James, Cincinnati Quart. Jour. Sci., 1, 1874, p. 19.

*Dalmanella emacerata* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 207, 224, pl. 5C, figs. 1, 2.—Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 260, fig. 311i-m.—Foerste, Sci. Lab. Denison Univ., Bull. 17, 1912, p. 128, pl. 8, figs. 3a, b.

*Dalmanella testudinaria* var. *emacerata* Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res., Indiana, 1908, p. 898, pl. 33, figs. 5-5a.

*Dalmanella emacerata filosa* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 214, pl. 4, fig. 1.

Eden (Fulton-Southgate): Cincinnati, Ohio, and vicinity.

**Dalmanella emacerata brevicula** (Foerste).

*Dalmanella breviculus* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, pp. 216, 322, pl. 7, fig. 5.

*Orthis emacerata* (part) Hall, 15th Rep. New York State Cab. Nat. Hist., 1862, pl. 2, fig. 2.

*Dalmanella emacerata brevicula* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 128.

Eden (Southgate): Cincinnati, Ohio; Vevay, Indiana.

*DALMANELLA EMACERATA FILOSA* Foerste. See *Dalmanella emacerata*.

**Dalmanella(?) evadne** (Billings).

*Orthis evadne* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 81, fig. 74; p. 79 (adv. sheets 1862).—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 300, pl. 24, fig. 8.—Seely, Vermont State Geol., Rep., 7, 1910, pl. 62, fig. 8.

*Dalmanella?* *evadne* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 223, pl. 5B, figs. 25, 26.

Canadian: Point Levis, Quebec (Levis); Fort Cassin, Vermont (Beekmantown).

**Dalmanella fairmountensis** Foerste.

*Dalmanella fairmountensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 216, pl. 4, figs. 2a-c; p. 322, pl. 7, fig. 2.

Maysville (Bellevue): Hamilton and Cincinnati, Ohio; New Trenton, etc., Indiana.

**Dalmanella fertilis** Bassler.

*Orthis* (*Dalmanella*) *testudinaria* Hayes and Ulrich, U. S. Geol. Surv., folio 95, Illust. Sheet, 1903, figs. 42, 43.

*Orthis* (*Dalmanella*) *fertilis* Bassler, Bull. Virginia Geol. Surv., 2, 1909, pl. 24; fig. 5.

Trenton (Hermitage): Central Tennessee, Kentucky, and Virginia.

*Cotypes* and *plesiotypes*.—Cat. No. 35455, U.S.N.M.

**DALMANELLA FISSIPLICA** Foerste. See *Orthostrophia* (*Schizoramma*) *fissiplica*.

**Dalmanella freitana** (Clarke).

*Orthis* (*Dalmanella*) *freitana* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 10, pl. 1, figs. 22-24.

Silurian: Rio Trombetas, Brazil.

**Dalmanella fultonensis** Foerste.

*Dalmanella emacerata* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 321, pl. 7, fig. 1.

*Dalmanella fultonensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 129. Eden (Fulton): Cincinnati, Ohio.

**Dalmanella futilis** (Sardeson).

*Orthis futilis* Sardeson, Amer. Geol., 19, 1897, p. 104, pl. 5, figs. 25-27.

*Dalmanella testudinaria futilis* Schuchert, Bull. U. S. Geol. Surv., 87, p. 205.

Richmond (Maquoketa): Near Granger and Wykoff, Minnesota.

**DALMANELLA GIBBOSA** Hall and Clarke. See *Pianodema subæquata gibbosa*.

**Dalmanella hamburgensis** (Walcott).

*Orthis hamburgensis* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 73, pl. 2, fig. 5.

*Orthis* (*Dalmanella*) *hamburgensis*? Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 440, pl. 33, figs. 14-16.

Upper Pogonip: Eureka District, Nevada.

Black River: St. Paul, etc., Minnesota (Decorah); High Bridge, Kentucky (Lowville).

*Cotypes*.—Cat. No. 17259, U.S.N.M.

**Dalmanella holiensis** Cleland.

*Dalmanella holiensis* Cleland, Bull. Amer. Pal., 3, 1900, p. 130 (258), pl. 17, fig. 9.

Canadian (Tribes Hill): Near Fort Hunter, New York.

**Dalmanella ignota** (Sardeson).

*Orthis ignota* Sardeson, Amer. Geol., 19, 1897, pp. 99, 181, pl. 5, figs. 1-7.

*Dalmanella testudinaria ignota* Schuchert, Bull. U. S. Geol. Surv., 87, 1907, p. 205.

Richmond (Maquoketa): Near Spring Valley, Minnesota.

**DALMANELLA JUGOSA** Foerste. See *Dalmanella meeki*.

**Dalmanella lunata** (Sowerby).

*Orthis lunata* Sowerby, Sil. Syst., 1839, p. 611, pl. 5, fig. 15.—Davidson, British Sil. Brach., 1869, p. 215, pl. 28, figs. 1-5.



**Dalmanella lunata**—Continued.

*Dalmanella lunata* Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 337, pl. 30, figs. 1-5, 8.

*Orthis orbicularis* Sowerby, Sil. Syst., 1839, p. 611, pl. 5, fig. 16.

Silurian: England; Leighton Cove, Washington County, Maine (Pembroke).

*Plesiotypes*.—Cat. Nos. 58957-58959, U.S.N.M.

**Dalmanella macleodi** (Whitfield).

*Orthis macleodi* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 43, pl. 7, figs. 1-4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 523, figs.

*Dalmanella macleodi* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 224.

Canadian (Beekmantown): Beekmantown, New York.

**Dalmanella macrior** (Sardeson).

*Orthis macrior* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 330, pl. 5, figs. 5-7.

*Orthis* (*Dalmanella*) *testudinaria* var. *emacerata* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 445, pl. 33, figs. 23-24.

*Orthis emacerata* Sardeson, Amer. Geol., 19, 1897, p. 102, pl. 5, figs. 14-18, 28. Richmond (Maquoketa): Spring Valley and Granger, Minnesota.

**Dalmanella meeki** (Miller).

*Orthis emacerata* Meek (not Hall), Pal. Ohio, 1, 1873, p. 109, pl. 8, figs. 1, 2.

*Orthis parva* Billings (not Verneuil), Cat. Sil. Foss. Anticosti, 1866, p. 41.

*Orthis meeki* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 20.—Sardeson, Amer. Geol., 19, 1897, p. 98, pl. 4, figs. 24-29.

*Dalmanella meeki* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 206, 224, pl. 5C, fig. 3.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 218 (synonymy and history discussed).

*Dalmanella testudinaria* var. *meeki* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 899, pl. 33, figs. 6-6g.

*Orthis jugosa* James, Paleontologist, 4, 1879, p. 31.

*Dalmanella jugosa* Foerste, Bull. Sci. Lab. Denison Univ., 4, 1909, pl. 14, figs. 16a-b, p. 218; Ohio Nat., 12, No. 3, 1912, p. 453, pl. 22, fig. 1.

Richmond: Oxford, etc., Ohio; Indiana; Kentucky; Anticosti; etc.

**Dalmanella melita** (Hall and Whitfield).

*Leptaena melita* Hall and Whitfield, King's U. S. Geol. Surv., 40th Parl., 4, 1877, p. 208, pl. 1, figs. 13, 14.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 22.

*Dalmanella melita* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 202.

Lower Pogonip: Eureka District, Nevada.

**Dalmanella modesta** Savage.

*Dalmanella modesta* Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 48, pl. 1, figs. 14, 15.

Upper Medinan (Girardeau): Alexander County, Illinois.

**Dalmanella multisecta** (Meek).

*Orthis multisecta* James, Cat. L. Sil. Foss. Cincinnati Group, 1871, p. 10 (nom. nud.).—Sardeson, Amer. Geol., 19, 1897, p. 97, pl. 4, figs. 20-23.

*Orthis emacerata* var. *multisecta* Meek, Pal. Ohio, 1, 1873, p. 112, pl. 8, fig. 3.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 22.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 515, figs.

*Dalmanella testudinaria* var. *multisecta* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 901, pl. 33, figs. 4, 4c.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 205.



**Dalmanella multisecta**—Continued.

*Dalmanella multisecta* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 207–224.—Cumings, Amer. Geol., 28, 1901, p. 374.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 217.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 14, figs. 4–6.

Eden: Cincinnati, Ohio, and vicinity; Maryland; Virginia; East Tennessee; Albany County, New York (Indian Ladder).

**DALMANELLA PERVETA** Hall and Clarke. See *Pianodema subæquata* and *P. subæquata perveta*.

**DALMANELLA? PLICIFERA** Schuchert. See *Leptaena incrassata*.

**Dalmanella porrecta** (Sardeson).

*Orthis porrecta* Sardeson, Amer. Geol., 19, 1897, p. 104, pl. 5, figs. 19–24.

*Dalmanella testudinaria porrecta* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 205.

Richmond (Maquoketa): Near Granger, Minnesota.

**Dalmanella postelegantula** Weller.

*Dalmanella postelegantula* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 232, pl. 20, figs. 21–24.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

**Dalmanella rogata** (Sardeson).

*Orthis rogata* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 331, pl. 5, figs. 1–4; Amer. Geol., 19, 1897, p. 95, pl. 4, figs. 1–10.

*Orthis* (*Dalmanella*) *testudinaria* Hall, Pal. New York, 8, pt. 1, 1892, pl. 5B, figs. 27 to 31.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 441, pl. 33, figs. 17–22.

Black River and Trenton: St. Paul, etc., Minnesota; Iowa and Wisconsin.

**Dalmanella? ruidā** (Billings).

*Orthis ruidā* Billings, Cat. Sil. Fossils of Anticosti, 1866, p. 42.

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

**Dalmanella smithi** (Clarke).

*Orthis* (*Dalmanella*) *smithi* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 11, pl. 1, figs. 12–16.

Silurian: Rio Trombetas, Brazil.

**DALMANELLA STONENSIS** Hall and Clarke. See *Pianodema stonensis*.

**DALMANELLA SUBÆQUATA** Hall and Clarke. See *Pianodema subæquata*.

**DALMANELLA SUBÆQUATA** var. **PERVETUS** Ruedemann. See *Pianodema subæquata perveta*.

**Dalmanella tersa** (Sardeson).

*Orthis tersus* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 331, pl. 5, figs. 11–13; Amer. Geol., 19, 1897, p. 100, pl. 5, figs. 8–13.

*Dalmanella tersa* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 204.

Richmond (Fernvale): Wilmington, Illinois; Tennessee.

**Dalmanella testudinaria** (Dalman).

*Orthis testudinaria* Dalman, Kongl. Svenska Vet.-Akad. Handl., 1828, p. 115, pl. 2, fig. 4.—Conrad, Ann. Rep. Geol. Surv. New York, 1839, p. 63.—Emmons,

Geol. New York, Rep. 2d Dist., 1842, p. 404, fig. 4.—Hall, Pal. New York, 1, 1847, p. 117, pl. 32, fig. 1; p. 288, pl. 79, fig. 4.—Emmons, Amer. Geol., 1,

**Dalmanella testudinaria**—Continued.

pt. 2, 1855, p. 194, pl. 9, figs. 1a-i; pl. 17, fig. 12.—Billings, Canadian Nat. and Geol., 1, 1856, p. 40, fig. 1.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 818, fig. 601.—Emmons, Man. Geol., 1860, p. 102, fig. 3; p. 99, fig. 88.—Hitchcock, Geol. Vermont, 1, 1862, p. 294, fig. 201.—Chapman, Canadian Jour., n. s., 7, 1862, p. 111, fig. 90; *ibid.*, 8, 1863, p. 199, fig. 182.—Billings, Geol. Canada, 1863, p. 165, fig. 144.—Chapman, Expos. Min. Geol. Canada, 1864, p. 114, fig. 90; p. 171, fig. 182.—Safford, Geol. Tennessee, 1869, p. 275, fig. 8.—Miller, Cincinnati Quart. Jour. Sci., 1875, p. 20.—White, Wheeler's Expl. Surv. west 100th Merid., 4, 1875, p. 72.—Shaler, Mem. Geol. Surv. Kentucky, 1, 1876, p. 31.—Whitfield, Geol. Wisconsin, 4, 1882, p. 258, pl. 12, figs. 5-7.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 1-4, 6-13.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 155, fig.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 72, pl. 11, fig. 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 536, figs.; p. 537, figs.—Sardeson, Amer. Geol., 19, 1897, pp. 92, 95.

*Orthis striatula* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 394, fig. 3.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 366, fig. 3.

*Orthis disparilis* Owen (not Conrad), Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, pl. 2B, fig. 23.

*Dalmanella testudinaria* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 190, 206, 218, 224, pl. 5B, figs. 31-39.—Ruedemann, Bull. New York State Mus., 49, 1902, p. 25.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 155, pl. 10, figs. 1, 2; p. 216, pl. 16, figs. 4, 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 260, fig. 311a-e.

*Orthis* (*Dalmanella*) *testudinaria* Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 2, 1895, p. 121; *ibid.*, 3, pt. 3, 1897, pp. 177, 241.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 156.

Middle and Upper Ordovician: Europe and America.

Observation.—The above miscellaneous citations refer to a variety of forms.

*DALAMANELLA TESTUDINARIA* var. *EMACERATA* Cumings. See *Dalmanella emacerata*.

*DALMANELLA TESTUDINARIA* *FUTILIS* Schuchert. See *Dalmanella futilis*.

*DALMANELLA TESTUDINARIA* *IGNOTA* Schuchert. See *Dalmanella ignota*.

*DALMANELLA TESTUDINARIA* var. *MEEKI* Cumings. See *Dalmanella meeki*.

*DALMANELLA TESTUDINARIA* var. *MULTISECTA* Schuchert. See *Dalmanella multisecta*.

*DALMANELLA TESTUDINARIA* *PORRECTA* Schuchert. See *Dalmanella porrecta*.

**Dalmanella wemplei** Cleland.

*Dalmanella* (*Orthis*) *wemplei* Cleland, Bull. Amer. Pal., 3, 1900, p. 129 (257), pl. 17, figs. 10-13.

*Dalmanella wemplei* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 124, pl. 4, figs. 10-12.—Cleland, Bull. Amer. Pal., 4, 1903, p. 19.

Canadian (Tribes Hill): Tribes Hill, Fort Hunter, etc., New York; New Jersey.

*DALMANIA* Salter. See *Dalmanites* Barrande.

*DALMANIA* *BICORNIS* Hall. See *Dalmanites bicornis*.

*DALMANIA* *BREVICEPS* Hall. See *Chasmops breviceps*.

*DALMANIA* *CALLICEPHALA* Hall. See *Pterygometopus callicephalus*.



**DALMANIA CAUDATA** Roemer. See *Dalmanites limulurus*.

**DALMANIA DANAE** Meek and Worthen. See *Dalmanites danae*.

**DALMANIA LIMULURUS** Lincklaen. See *Dalmanites limulurus*.

**DALMANIA LOGANI** Hall. See *Dalmanites logani* Hall.

**DALMANIA META** Hall. See *Pterygometopus meta*.

**DALMANIA VERRUCOSA** Hall. See *Dalmanites verrucosus*.

**DALMANIA VIGILANS** Hall. See *Dalmanites vigilans* and *D. halli*.

**DALMANITES** Barrande.

Genotype: *Trilobus caudatus* Bronn.

*Dalmania* Emmrich, *Zur. Naturg. d. Tril.*, 1844, p. 15; *Neues Jahrb. f. Min.*, etc., 1845, p. 40.—Salter, *Mem. Geol. Surv. Great Britain*, 2, pt. 1, 1848, p. 336.—Barrande, *Neues Jahrb. f. Min.*, etc., 1850, p. 779; *Syst. Sil. du Centre Boheme*, 1, 1852, p. 528.—Pictet, *Traite de Pal.*, 2d ed., 2, 1854, p. 501.—Meek and Worthen, *Proc. Acad. Nat. Sci. Philadelphia*, 1865, p. 256.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7, ser. 30, 1881, p. 61.

*Dalmanites* Barrande, *Syst. Sil. du Centre, Boheme*, 1, 1852, p. 934.—Chapman, *Canadian Jour.*, n. s., 8, 1863, p. 30; *Expos. Min. Geol. Canada*, 1864, p. 138.—Meek and Worthen, *Geol. Surv. Illinois*, 3, 1868, p. 367.—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 142.—Hall, 28th Rep. *New York State Mus. Nat. Hist.*, mus. ed., 1879, p. 191.—Packard, *Amer. Nat.*, 14, 1880, p. 504.—Hall, 11th Ann. Rep. *Indiana Dep. Geol. Nat. Hist.*, 1882, p. 337.—Zittel, *Handb. Pal.*, 2, 1885, p. 615.—Clarke, *Jour. Morph.*, 2, 1888, p. 254.—Hall and Clarke, *Pal. New York*, 7, 1888, p. 29.—Miller, *N. A. Geol. Pal.*, 1889, p. 542.—Beecher, *Amer. Jour. Sci.*, 3d ser., 46, 1893, p. 143.—Clarke, *Geol. Minnesota*, 3, pt. 2, 1894, p. 733.—Beecher, *Amer. Geol.*, 16, 1895, pp. 167, 174, 178.—Ehlert, *Bull. Soc. Geol. France*, 3d ser., 24, 1896, p. 112, fig. 29-31.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, pp. 104, 184, pl. 3, figs. 5-8, 29; Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 637.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 223; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 223.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 34, No. 8, 1901, pp. 27, 52.—Jaekel, *Zeits. d. d. geol. Gesell.*, 53, 1901, p. 157.—Cumings, 32d Ann. Rep. *Dep. Geol. Nat. Res.*, Indiana, 1908, p. 1051.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 324.—Raymond, Zittel-Eastman *Textb. Pal.*, 1913, p. 726.

**DALMANITES ARCHATES** Billings. See *Pterygometopus achates*.

**Dalmanites arkansanus** Van Ingen.

*Dalmanites* (Synphoria) *arkansanus* Van Ingen, *School of Mines Quart.*, 23, 1901, p. 69, figs. 20-22, pl. figs. 33-37.

*Dalmanites arkansanus* Weller, *Bull. Chicago Acad. Sci.*, Nat. Hist. Surv., 4, pt. 2, 1907, p. 278, pl. 24, fig. 5.

Niagaran: St. Clair Springs, Independence County, Arkansas (St. Clair); near Lemont and Romeo, Illinois (Racine).

**Dalmanites aspinosus** Weller.

*Dalmanites aspinosa* Weller, *Pal. New Jersey*, 3, 1903, p. 252, pl. 22, fig. 1.—Maynard, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 499, pl. 91, fig. 16.

Helderbergian: Two miles south Tristates, New York (Decker Ferry); Devil's Backbone, near Cumberland and Cash Valley, Maryland (Keyser).

**Dalmanites bebryx** Billings.

*Dalmanites Bebryx* Billings, *Canadian Nat. Geol.*, 5, 1860, p. 61, fig. 8; *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 187, fig. 185.

Trenton: Ottawa, Ontario.



**Dalmanites bicornis** (Hall).

*Dalmania bicornis* Hall, 28th Rep. New York State Mus. Nat. Hist. (doc. ed.), 1877, pl. 33, fig. 18, 1877.

*Dalmanites bicornis* Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 196, pl. 33, fig. 18; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 342, pl. 35, fig. 18.

Niagaran (Waldron): Waldron, Indiana; Tennessee.

**DALMANITES BREVICEPS** Miller. See *Chasmops breviceps*.

**DALMANITES CALLICEPHALUS** Billings. See *Pterygometopus callicephalus*.

**DALMANITES CARLEYI** Meek. See *Pterygometopus carleyi*.

**DALMANITES CARLEYI ROGERSSENSIS** Foerste. See *Pterygometopus carleyi rogersensis*.

**Dalmanites danae** (Meek and Worthen).

*Dalmania Danae* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 264

*Dalmanites danae* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 363, pl. 6, figs. 1a-1f.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 325.

*Dalmanites danai* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 106, pl. 6, figs. 16, 17.

Upper Medinan (Edgewood): Near Thebes, Illinois; Edgewood and Louisiana, Missouri.

**DALMANITES EBORACEUS** Miller. See *Pterygometopus eboraceus*.

**DALMANITES (PTERYGOMETOPUS) GOODRIGII** Schuchert. See *Pterygometopus goodridgii*.

**Dalmanites halli** Weller.

*Dalmania vigilans* Hall (not Hall, 1862), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 33, figs. 1-4.

*Dalmanites vigilans* Hall, *ibid.*, mus. ed., 1879, p. 193, pl. 33, figs. 1-4; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 339, pl. 35, figs. 1-4; pl. 33, fig. 9.

*Dalmanites halli* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 195.

Niagaran (Waldron): Waldron, Indiana.

**Dalmanites illinoisensis** Weller.

*Dalmanites illinoisensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 275, pl. 25, figs. 1-2.

Niagaran (Racine): Joliet, Bonfield, etc., Illinois.

**DALMANITES INTERMEDIUS** Walcott. See *Pterygometopus intermedius*.

**Dalmanites keyserensis** Swartz.

*Dalmanites keyserensis* Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 499, pl. 91, figs. 8, 9.

Helderbergian (Keyser): Tonoloway, Maryland.

**Dalmanites limulurus** (Green).

*Asaphus limulurus* Green, Mon. Tril. N. A. 1832, p. 48.—Harlan, Trans. Geol. Soc. Pennsylvania, 1, pt. 1, 1834, p. 101.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 18, pl. 4, fig. 1.—Hall, Geol. New York, pt. 4, 1843, p. 101, figs. 1-2; tab. org. rem., 10, figs. 1-2.—Owen, Amer. Jour. Sci. Arts, 46, 1845, pp. 309-310, figs. 1, 2.

**Dalmanites limulurus**—Continued.

*Phacops limulurus* Hall, Pal. New York, 2, 1852, p. 303, pl. 67, figs. 1-8.—Billings, Can. Nat. Geol., 1, 1856, p. 57, pl. 1, fig. 7.

*Dalmania limulurus* Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 8, figs. 2, 3.—Hall, Pal. New York, 3, 1859, p. 357.

*Dalmanites limulurus* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 320, fig. 340.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31, fig. 145, p. 212, fig. 221; Expos. Min. Geol. Canada, 1864, p. 138, fig. 145; p. 184, fig. 221.—Miller, N. A. Geol. Pal., 1889, p. 543, fig. 998.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 188, figs.—Clarke, 45th Rep. New York State Mus., 1892, p. 355; 11th Rep. State Geol. New York for 1891, 1894, p. 39.—Grabau, Bul. New York State Mus., 45, 1901, pp. 223-224, fig. 155; Bull. Buffalo Soc. Nat. Sci., 1901, p. 224, fig. 155.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 325, fig. 1641.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 726, fig. 1408.

*Asaphus caudatus* Green, Mon. Tril. N. A., 1832, p. 50.—Eaton, Geol. Textb., 2d ed., 1832, p. 31, pl. 2, fig. 18.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 19.

*Dalmania caudata* Roemer, Sil. Fauna West Tennessee, 1860, p. 82, pl. 5, fig. 21.

*Asaphus wetherilli* Green, Mon. Tril. N. A., 1832, p. 57.—Harlan, Trans. Geol. Soc. Pennsylvania, 1, pt. 1, 1834, p. 101.

*Asaphus edwardsi* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 19.

*Asaphus cordieri* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 18, pl. 4, fig. 2.

Clinton (Rochester-Osgood): Rochester, Lockport, etc., New York; Ontario; Indiana; Tennessee; Maryland; Pennsylvania.

*Plastotype*.—Cat. No. 4954, U.S.N.M.

**Dalmanites limulurus breviceudatus** Foerste.

*Dalmanites limulurus breviceudatus* Foerste, Cincinnati Soc. Nat. Hist., Jour., 21, 1909, p. 35, pl. 2, figs. 20a-c.

Clinton (West Union): New Martins, Lewis County, Kentucky.

**Dalmanites logani** (Hall).

*Dalmania logani* Hall, Canadian Nat. Geol., 5, 1860, p. 156.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 64; *ibid.*, 2d ed., 1868, p. 608, fig. 215.

Silurian (Stonehouse): Arisaig, Nova Scotia.

**Dalmanites lunatus** Lambert.

*Dalmanites lunatus* Lambert, Bull. Geol. Soc. America, 15, 1904, p. 482, pl. 44, figs. 1-3, 5; Lambert in Hitchcock's Geol. of Littleton, 1905, pp. 33-38.

Silurian: Near Littleton, New Hampshire.

*Cotypes*.—Cat. No. 50459, U.S.N.M.

**Dalmanites platycaudatus** Weller.

*Dalmanites platycaudatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 272, pl. 25, figs. 3-5.

Niagaran (Racine): Near Lemont, Illinois.

**DALMANITES SCHMIDTI** Miller. See *Pterygometopus schmidtii*.

**DALMANITES TROOSTI** Safford. See *Pterygometopus troosti*.

**Dalmanites verrucosus** (Hall).

*Dalmania verrucosa* Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1877, p. 195, pl. 33, figs. 5-17; pl. 34, figs. 13-15.

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**Dalmanites verrucosus**—Continued.

- Dalmanites verrucosa* Hall, Trans. Albany Inst., 4, 1864, p. 218; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 341, pl. 35, figs. 5-17; pl. 36, figs. 13-15.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 191, figs.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 280, pl. 25, figs. 6-7.
- Niagaran: Waldron, Indiana; Tennessee (Waldron); Bonfield, and Jersey County Illinois.

**Dalmanites vigilans** Hall.

- Dalmanites vigilans* Hall, Rep. Prog. Geol. Surv. Wisconsin, 1861, p. 51.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 276, pl. 24, figs. 1-4.
- Dalmania vigilans* Hall, Adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1862, p. 31; Geol. Surv. Wisconsin, 1, 1862, p. 433, figs. 3-4; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 335, figs. 1-2; p. 375, pl. 21, figs. 16-18; rev. ed., 1870, p. 426, figs. 13-14, pl. 21, figs. 16-18.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.
- Dalmanites* (Synphoria) *vigilans* Van Ingen, School of Mines Quart., 23, 1901, p. 67, pl., figs. 28-32.—Kindle, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 485, pl. 23, figs. 4-7; pl. 24, fig. 20.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 325.
- Dalmanites* (Odontochile) *vigilans* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 699 (gen. ref.).
- Niagaran: Waukesha, Wauwatosa, etc., Wisconsin; Anderson and Pendleton, Indiana; Joliet and Lemont, Illinois; St. Clair Springs, Independence County, Arkansas.

**DALMANITES VIGILANS** Hall (1877). See *Dalmanites halli*.

**Dalmanites werthneri** Foerste.

- Dalmanites werthneri* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 116; 2, 1887, p. 101, pl. 8, figs. 22, 22a, 23-25; Geol. Surv. Ohio, 7, 1895, p. 530, pl. 27, figs. 22, 22a, 23-25.
- Upper Medinan (Brassfield): Near Dayton, Ohio.

**DANIA** Edwards and Haime.

Genotype: *D. huronica* Edwards and Haime.

- Dania* Edwards and Haime, Compt. Rend. de l'Acad. Sci., 29, 1849, p. 261; Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 154, 275.—Pictet, Traite de Pal., 2d ed., 1857, p. 443.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 280.—Nicholson, Tab. Corals Pal. Period, 1879, p. 327.—Zittel, Handb. Pal., 1, 1880, p. 617.—Roemer, Leth. geog. pt. 1, Leth. Pal., 1883, p. 461.—Miller, N. A. Geol. Pal., 1889, p. 184.

**Dania huronica** Edwards and Haime.

- Dania huronica* Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. Hist. Nat., 5), 1851, p. 275, pl. 18, fig. 2, 2a, 2b.—Milne Edwards, Hist. Nat. d. Corall., 3, 1860, p. 281.—Roemer, Leth. geog., Leth. Pal., 1883, p. 461, fig. 112.

Niagaran: Drummond Island, Lake Huron.

**DAWSONIA** Nicholson.

Genotype: *D. campanulata* Nicholson.

- "Ovarian vesicles of graptolites" Nicholson, Mon. British Grapt., pt. 1, 1872, p. 71.
- Dawsonia* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 139.—Nicholson and Lyddecke, Man. Pal., 1, 1889, p. 214.—Miller, N. A. Geol. Pal., 1889, p. 184.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 162.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 738-740; *ibid.*, Mem. 11, pt. 2, 1908, p. 484.



**Dawsonia acuminata** Nicholson.

*Dawsonia acuminata* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1878, p. 140, fig. 3a, a'.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485, fig. 466.

Lower Ordovician: Point Levis, Quebec (Levis); Scotland (Llandeilo).

**DAWSONIA CAMPANULATA** Ruedemann. See *Azygograptus? simplex*.

**Dawsonia monodon** Gurley.

*Dawsonia monodon* Gurley, Jour. Geol., 4, 1896, p. 88, pl. 5, fig. 4.—Ruedemann, New York State Pal. Ann. Rep., 1902, pp. 554, 556; Mem. New York State Mus., 7, pt. 1, Addendum, 1904, pp. 741, 742, pl. 17, figs. 21–26, fig. 105.

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); Deepkill, Rensselaer County, New York (*Deepkill*, *Tetragraptus* zone).

**DAWSONIA ROTUNDA** Nicholson. See *Acrothele rotunda*.

**DAWSONIA SILIQUARIA** James. See *Lockeia siliquaria*.

**Dawsonia tenuistriata** Nicholson.

*Dawsonia tenuistriata* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 141, fig. 3c, c', d, d'.

Canadian (Levis): Point Levis, Quebec.

Observation.—The specimens figured by Nicholson are very probably small brachiopods.

**Dawsonia tridens** Gurley.

*Dawsonia tridens* Gurley, Jour. Geol., 4; 1896, p. 88, pl. 5, fig. 5.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, Addendum, 1904, p. 741, pl. 17, figs. 18–20.

Canadian: Point Levis, Quebec (Levis, *Tetragraptus* zone); Deepkill, Rensselaer County, New York (*Deepkill*, *Tetragraptus* zone).

**DAWSONOCERAS** Hyatt.

Genotype: *Orthoceras annulatum* Sowerby.

*Dawsonoceras* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 276; Zittel-Eastman Textb. Pal., 1, 1900, p. 518; 2d ed., 1913, p. 599.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58.

**Dawsonoceras annulatum** (Sowerby).

*Orthoceras annulatum* Sowerby, Min. Conch., 2, 1818, p. 77; Eaton, Geol. Textb., 2d ed., 1832, p. 29, pl. 3, fig. 24.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 110, fig. 1; tab. ill. 17, fig. 1; Pal. New York, 2, 1852, p. 96, pl. 29, fig. 3.—Marcou, Geol. Map United States and British Provinces, etc., 1853, p. 27, pl. 2, fig. 1.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 78, pl. 5, figs. 18a, 18b.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 83.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (Extras, 1865), p. 351, pl. 20 (11), figs. 4–6 (see expl. of pls., p. 393); rev. ed., 1870, p. 411, pl. 20, figs. 4–6; pl. 24, figs. 2–4, p. 433.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1895, p. 147, pl. 9, fig. 1.—Whitfield, Geol. Wisconsin, 4, 1882, p. 298, pl. 19, fig. 1.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 324.—White, *ibid.*, 1882, p. 358, pl. 38, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 194.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, 1884, pt. 1, p. 38.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 542, figs.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 215, fig. 147; Bull. New York State Mus., 45, 1901, p. 215, fig. 147.

**Dawsonoceras annulatum**—Continued.

- Orthoceras* (*Dawsonoceras*) cf. *annulatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 472, pl. 19, figs. 3, 4.
- Orthoceras* (*Cycloceras*) *annulatum* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 282, pl. 8, fig. 5.
- Dawsonoceras annulatum* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58, figs. 1260, 1261.
- Orthoceras annulatum* var. *americanum* Foord, Cat. Fossil Ceph. British Mus., 1888, p. 56.—Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 2, 1895, p. 101.
- Orthoceras* (*Dawsonoceras*) *annulatum* var. *americanum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 472.
- Dawsonoceras annulatum* var. *americanum* Clarke and Ruedemann, New York State Mus., 5, 1903, p. 81, pl. 10, figs. 9–21; pl. 11, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58.—Grabau, Michigan Geol. Surv., Geol. (1), 1909, p. 196, pl. 28, fig. 8; pl. 29, fig. 1.
- Orthoceras nodocostum* McChesney, Desc. New Fossils, 1861, p. 94; Plates Illust. N. Sp. Fossils, 1865, pl. 9, fig. 5.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 101.
- Orthoceras nodocostatum* McChesney, Trans. Chicago Acad. Sci., 1, 1868, p. 53, pl. 9, fig. 5.
- Orthoceras Laphami* McChesney, Desc. New Fossils, 1861, p. 91.
- Orthoceras bartonense* Spencer, Bull. Missouri State Mus., 1, 1884, p. 60, pl. 7, fig. 7; Trans. Acad. Sci. St. Louis, 4, 1884, p. 609, pl. 7, fig. 7.—Clarke and Ruedemann, Mem. New York State Mus., 5, p. 83.
- Orthoceras undulatum* Hall, Pal. New York, 2, 1852, p. 293, pl. 64, fig. 1a–f; pl. 65, fig. 3.
- Silurian: England; Gotland. Niagaran: New York; Canada; Ohio; Indiana; Tennessee; Wisconsin; etc. Upper Monroan: Michigan and Ontario.
- Observation.—Several species may be included in the above synonymy.

**Dawsonoceras hammelli** (Foerste).

- Orthoceras* (*Dawsonoceras*) *hammelli* Foerste, Bull. Sci. Lab., Denison Univ., 16, 1910, p. 74, pl. 1, fig. 4.
- Richmond: Dog Falls and Madison, Indiana; Jefferson County, Kentucky (Whitewater-Saluda); West Milton, Ohio (Elkhorn).

**Dawsonoceras tenuilineatum** Savage.

- Dawsonoceras tenuilineatum* Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 119, pl. 7, fig. 22.
- Upper Medinan: Pike County, Missouri (Edgewood); Will County, Illinois (Chanahan).

**DEIPHON** Barrande.Genotype: *D. forbesi* Barrande.

- Deiphon* Barrande, Neues Jahrb. Min., etc., 1850, p. 779.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 522.—Zittel, Handb. Pal., 2, 1885, p. 618.—Koken, Die Leitfossilien, Leipzig, 1896, p. 33.—Reed, Geol. Mag., dec. 4, 5, 1898, p. 211.—Beecher, Zittel-Eastman Textb. Pal., 1, 1900, p. 636.—Raymond, ibid., 2d ed., 1913, p. 725.

**Deiphon americanus** Weller.

- Deiphon americanus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1907, p. 268, pl. 24, fig. 14.
- Niagaran (Racine): Joliet, Romeo, etc., Illinois.

**Deiphon forbesi** Barrande.

- Deiphon forbesi* Barrande, Haidinger's Berichte, 1850, p. 6.—Salter, Mon. British Tril., 1865, p. 88, pl. 7, figs. 1–12.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.



**Delphon forbesi**—Continued.

*Sphaerexochus pisum* Foerste, Geol. Surv. Ohio, 7, 1895, p. 528, pl. 37A, figs. 14a-14b.

*Deiphon pisum* Foerste, Amer. Jour. Sci., 4th ser., 18, 1904, p. 340.

Silurian: Bohemia and England; Dayton, Ohio (Brassfield); Lockport, New York (Rochester); Arkansas (St. Clair).

**DEIPHON PISUM** Foerste. See *Deiphon forbesi*.

**DEIROCERAS** Hyatt. See *Actinoceras* subgenus *Deirotoceras*.

**DEKAYELLA** Ulrich.

Genotype: *Dekayella obscura* Ulrich

*Dekayella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155; *ibid.*, 6, 1883, p. 90.—Miller, N. A. Geol. Pal., 1889, p. 184.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 372; Geol. Minnesota, 3, 1893, p. 269; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 273.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 589.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Cumings, Amer. Geol., 29, 1902, p. 200.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 27.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 205; Zittel-Eastman Textb. Pal., 1913, p. 333.

**DEKAYELLA CYSTATA** Cumings. See *Heterotrypa frondosa*.

**Dekayella foliacea** Ulrich and Bassler.

*Dekayella foliacea* Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 28, pl. 7, figs. 10-12.

Trenton (Cynthiana): Lexington, Kentucky.

*Holotype*.—Cat. No. 43187, U.S.N.M.

**Dekayella obscura** Ulrich.

*Dekayella obscura* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 89, pl. 1, figs. 4-4b; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 454 (p. 274).—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 180-182 (p. 589).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333, fig. 480.

*Dekayia obscura* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 816, pl. 14, figs. 3, 3a.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 43659, U.S.N.M.

**DEKAYELLA PERFRONDOSA PROLIFICA** Cumings. See *Heterotrypa subramosa prolifica*.

**Dekayella prænuntia** Ulrich.

*Dekayella prænuntia* Ulrich, Geol. Minnesota, 3, 1893, p. 270, pl. 23, figs. 32-47.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 177-179 (p. 589).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132, figs. 188b, 190b.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 205, 206, fig. 111.

Black River (Decorah): Minneapolis, etc., Minnesota; Iowa.

Middle Ordovician (Wassaleum and Kuckers): Esthonia, Russia.

*Holotype*.—Cat. No. 43528, U.S.N.M.

**Dekayella prænuntia echinata** Ulrich.

*Dekayella prænuntia* var. *echinata* Ulrich, Geol. Minnesota, 3, 1893, p. 271, pl. 23, figs. 32-38.

Black River (Decorah): Near Fountain, Minneapolis and St. Paul, Minnesota.

*Cotypes*.—Cat. No. 43530, U.S.N.M.



**Dekayella prænuntia multipora** Ulrich.

*Dekayella prænuntia* var. *multipora* Ulrich, Geol. Minnesota, 3, 1893, p. 272, pl. 23, figs. 44-47.

Black River (Decorah): Minneapolis, St. Paul, and Goodhue and Fillmore Counties, Minnesota.

*Holotype*.—Cat. No. 43531, U.S.N.M.

**Dekayella prænuntia nævigera** Ulrich.

*Dekayella prænuntia* var. *nævigera* Ulrich, Geol. Minnesota, 3, 1893, p. 271.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 207.

Black River (Decorah): Fillmore County, Minnesota.

Middle Ordovician (Wassaleum): Esthonia, Russia.

*Holotype*.—Cat. No. 43532, U.S.N.M.

**Dekayella prænuntia simplex** Ulrich.

*Dekayella prænuntia* var. *simplex* Ulrich, Geol. Minnesota, 3, 1893, p. 271, pl. 23, figs. 39-42.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 207, fig. 111.

Black River (Decorah): Minneapolis and St. Paul, Minnesota

Middle Ordovician (Wassaleum): Esthonia, Russia.

*Cotypes*.—Cat. No. 43529, U.S.N.M.

**DEKAYELLA ROBUSTA** Foord. See *Dekayella ulrichi*.

**Dekayella singularis** (Ulrich).

*Heterotrypa singularis* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 415, pl. 37, figs. 3-3e; Geol. Minnesota, 3, 1893, p. 268.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, fig. 147 (p. 579).

*Monticulipora singularis* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 77.

*Dekayella singularis* Ulrich and Bassler, Smiths. Misc. Coll. Quart., 47, 1904, p. 27 (gen. ref.).

Richmond (Fernvale): Wilmington, Illinois; Tennessee; Wisconsin.

Sections of *cotype*.—Cat. No. 43750, U.S.N.M.

**Dekayella trentonensis** (Ulrich).

*Dekayia trentonensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1883, p. 151, pl. 6, figs. 6, 6a; Geol. Minnesota, 3, 1893, p. 274.

*Dekayella trentonensis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 227.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 42, pl. 1, fig. 3.

Trenton: Burgin and Frankfort, Kentucky (Wilmore); St. Paul and Cannon Falls, Minnesota (Prosser).

*Holotype*.—Cat. No. 43660, U.S.N.M.

**Dekayella ulrichi** (Nicholson).

*Chætetes Fletcheri* (not Milne-Edwards and Haime) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 504, pl. 29, figs. 6, 6a; Pal. Ohio, 2, 1875, p. 197, pl. 21, figs. 7, 7a; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 90, pl. 5, fig. 14.—Quenstedt, Roehren- und Sternkorallen, 1891, p. 83, pl. 146, fig. 27.

*Monticulipora* (*Heterotrypa*) *Ulrichii* Nicholson, Genus *Monticulipora*, 1881, p. 131, fig. 22.

*Monticulipora ulrichii* Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 249, pl. 11, fig. 10.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 179.—James, *ibid.*, 16, 1894, p. 201.

*Dekayella ulrichi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1883, pp. 91, 153.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 227.—Cumings, Amer. Geol., 28, 1901, p. 374.—Nickles, Bull. Kentucky Geol. Surv., 5,

**Dekayella ulrichi**—Continued.

- 1905, p. 47, pl. 2, fig. 4.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 35, pl. 2, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132.
- Dekayia ulrichi* Cumings, Amer. Geol., 29, 1902, p. 13, pl. 9, fig. 1; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 824, pl. 14, figs. 4, 4b; pl. 28, fig. 7.
- Dekayella robusta* Foord, Ann. Mag. Nat. Hist. (5), 13, 1884, p. 341, pl. 12, figs. 2-2d.
- Dekayella ulrichi-robusta* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 228.
- Dekayia ulrichi-robusta* Cumings, Amer. Geol., 29, 1902, p. 212, pl. 9, fig. 4, pl. 10, fig. 9; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 826, pl. 14, fig. 2, 2b; pl. 27, fig. 22.
- Monticulipora ohioensis* James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 183; *ibid.*, 16, 1894, p. 207.
- Eden: Cincinnati, Ohio, and vicinity.

*DEKAYELLA ULRICHI* var. *ROBUSTA* Nickles and Bassler. See *Dekayella ulrichi*.

**DEKAYIA** Milne-Edwards and Haime.

Genotype: *D. aspera* Milne-Edwards and Haime.

- Dekayia* Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 277—Pictet, Traite de Pal., 2d ed., 1857, p. 443.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 283.—Nicholson, Pal. Tab. Corals, 1879, p. 291; Zittel Handb. Pal., 1, 1880, p. 615; Genus *Monticulipora*, 1881, p. 98.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155; *ibid.*, 6, 1883, p. 148.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 479.—Waagen and Wentzel, Pal. Indica (13), 1886, p. 874.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 28.—Miller, N. A. Geol. Pal., 1889, p. 184.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 371, 415.—Rominger, Amer. Geol., 6, 1890, pp. 105-106-114.—Ulrich, Geol. Minnesota, 3, 1893, p. 274; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 273.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 115.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 578.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Cumings, Amer. Geol., 29, 1902, p. 197.—Ulrich and Bassler, Smiths. Misc. Coll. Quart., 47, 1904, p. 24.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 743.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333.

**Dekayia appressa** Ulrich.

- Dekayia appressa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1883, p. 152, pl. 6, figs. 7-7b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 809, pl. 13, fig. 3.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43655, U.S.N.M.

**Dekayia aspera** Milne-Edwards and Haime.

- Dekayia aspera* Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 278, pl. 16, figs. 2, 2a.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 283.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 148, pl. 6, 5; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 455, p. 274.—Miller, N. A. Geol. Pal., 1889, p. 184, fig. 165.—Cumings, Amer. Geol., 29, 1902, p. 214, pl. 9, fig. 10; pl. 10, fig. 10.—Nickles, Bull. Kentucky Geol. Surv., 5, p. 54, pl. 3, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133, fig. 190c.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 810, pl. 13, figs. 5-5b; pl. 27, fig. 20.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333, fig. 481.

*Monticulipora* (*Dekayia*) *aspera* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 28.—James, *ibid.*, 18, 1896, p. 116.



**Dekayia aspera**—Continued.

*Chaetetes attritus* Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 503, pl. 30, fig. 4, 4a; Pal. Ohio, 2, 1875, p. 194, pl. 21, fig. 4.—Buell, Trans. Wisconsin Acad. Sci., 5, 1882, p. 191.

*Monticulipora* (*Chaetetes*) *attritus* Chamberlin, Geol. Wisconsin, 1, 1883, p. 172, fig.

*Dekayia attrita* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 93, pl. 5, figs. 12, 12a; Pal. Tabulate Corals, 1879, p. 298, pl. 15, figs. 1–1c.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity; Nashville and Columbia, Tennessee.

**DEKAYIA ATTRITA** Nicholson. See *Dekayia aspera*.

**DEKAYIA FRONDOSA** Cumings. See *Heterotrypa frondosa*.

**DEKAYIA FRONDOSA** var. **CYSTATA** Cumings. See *Heterotrypa frondosa*.

**DEKAYIA INFLECTA** Cumings. See *Heterotrypa inflecta*.

**Dekayia maculata** James.

*Dekayia maculata* James, Paleontologist, No. 5, 1881, p. 37.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 35, pl. 2, figs. 13, 14.

*Monticulipora* (*Dekayia*) *maculata* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 116, fig. 11.

Eden (McMicken): Loveland and Cincinnati, Ohio, and vicinity.

**Dekayia magna** Cumings.

*Dekayia magna* Cumings, Amer. Geol., 28, 1901, p. 375, pl. 34, figs. 1–6; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 815, pl. 13, figs. 6, 6a; pl. 28, fig. 8.

Maysville (Bellevue): Vevay, etc., Indiana; Cincinnati, Ohio, and vicinity.

**Dekayia multispinosa** Ulrich.

*Dekayia multispinosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 154, pl. 6, figs. 8, 8a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43656, U.S.N.M.

**DEKAYIA OBSCURA** Cumings. See *Dekayella obscura*.

**DEKAYIA PAUPERA** Ulrich. See *Heterotrypa paupera*.

**Dekayia pelliculata** Ulrich.

*Dekayia pelliculata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 150, pl. 6, figs. 9, 9a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 818, pl. 13, figs. 4, 4a; pl. 28, fig. 5.

*Monticulipora* (*Dekayia*) *pelliculata* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 117.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Section of *holotype*.—Cat. No. 43657, U.S.N.M.

**DEKAYIA PERFRONDOSA** Cumings. See *Heterotrypa frondosa*.

**DEKAYIA PERFRONDOSA-SUBPULCHELLA** Cumings. See *Heterotrypa subpulchella*.

**DEKAYIA PROLIFICA** Cumings. See *Heterotrypa subramosa prolifica*.

**DEKAYIA SUBFRONDOSA** Cumings. See *Heterotrypa subfrondosa*.

**DEKAYIA SUBPULCHELLA** Cumings. See *Heterotrypa subpulchella*.



**DEKAYIA SUBRAMOSA** Cumings. See *Heterotrypa subramosa*.

**DEKAYIA TRENTONENSIS** Ulrich. See *Dekayella trentonensis*.

**DEKAYIA ULRICHI** Cumings. See *Dekayella ulrichi*.

**DEKAYIA ULRICHI-EXPANSA** Cumings. See *Heterotrypa lobata*.

**DEKAYIA ULRICHI-LOBATA** Cumings. See *Heterotrypa lobata*.

**DEKAYIA ULRICHI** var. **ROBUSTA** Nickles and Bassler. See *Dekayella ulrichi*.

**DELTAOCRINUS** Ulrich.

Genotype: *Cheirocrinus clarus* Hall.

*Deltacrinus* Ulrich, 14th Rep. Geol. Surv. Minnesota, 1886, p. 109, fig. 2.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 201 (Rev. Pal., 3, sec. 2, p. 277).—Miller, N. A. Geol. Pal., 1889, p. 237.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 148.—Springer, Zittel-Eastman Textb. Pal., 2d. ed., 1913, p. 213.

*Calceocrinus* (part) Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, footnote, pl. 9; *ibid.*, Mus. ed., 1879, p. 146, figs. 1, 2; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 281.

**Deltacrinus allenii** (Rowley).

*Calceocrinus allenii* Rowley, Amer. Geol., 34, 1904, p. 275, pl. 16, figs. 30–33.

Upper Medinan (Edgewood): Watson Station, Pike County, Missouri.

**Deltacrinus contractus** (Ringueberg).

*Calceocrinus contractus* Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 404, pl. 10, fig. 12.

*Deltacrinus contractus* Kindle, U. S. Geol. Surv., Geol. Atlas, U. S., folio 190, 1913, pp. 1–25, pls.

Niagaran (Lockport-Gasport member): Lockport, New York.

**Deltacrinus halli** (Ringueberg).

*Calceocrinus* sp. Hall, Pal. New York, 2, 1847, p. 352, pl. 85, figs. 5, 6.

*Calceocrinus halli* Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 403, pl. 10, fig. 9.

Clinton (Rochester): Middleport, New York.

Observation.—Hall based the genus *Calceocrinus* upon the specimen figured in 1847, but not named specifically.

**Deltacrinus indianensis** (Miller).

*Calceocrinus indianensis* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 645, pl. 6, fig. 37. (Adv. sheets, 1891, p. 35.)

Niagaran (Laurel): St. Paul, Indiana.

**Deltacrinus stigmatus** (Hall).

*Cheirocrinus stigmatus* Hall, Trans. Albany Inst., 4, 1863, p. 225. (Abstract, p. 31.)

*Calceocrinus stigmatus* Shumard, Trans. Acad. Sci. St. Louis (Cat. Pal. Foss.), 2, 1866, p. 358.—Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 19, figs. 9–11; *ibid.*, Mus. ed., 1879, p. 147, pl. 19, figs. 9–11; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 281, pl. 19, figs. 9–11.

*Deltacrinus stigmatus* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Minnesota, 1886, p. 111, 113 (gen. ref.).

Niagaran (Waldron): Waldron, Indiana.

***Deltaerlnus tunicatus* (Hall).**

*Calceocrinus tunicatus* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 147, fig. 1; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 281, fig. 1.

Niagaran (Waldron): Waldron, Indiana.

***Deltaerlnus typus* (Ringueberg).**

*Calceocrinus typus* Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 402, pl. 10, fig. 8.

Clinton (Rochester): Lockport, New York.

**DELTHYRIS ACUTILIRATA** Conrad. See *Platystrophia acutilirata*.

**DELTHYRIS BIALVEATA** Conrad. See *Spirifer (Eospirifer) radiatus*.

**DELTHYRIS BRACHYNOTA** Hall. See *Platystrophia biforata*.

**DELTHYRIS CRISPA** Dalman. See *Spirifer (Delthyris) crispus*.

**DELTHYRIS DECEMPPLICATUS** Hall. See *Spirifer (Delthyris) sulcata*.

**DELTHYRIS EXPANSUS** Emmons. See *Pterotheca expansa*.

**DELTHYRIS LYNX** Hall. See *Platystrophia biforata* and *P. lynx*.

**DELTHYRIS NIAGARENSIS** Owen. See *Spirifer (Delthyris) niagarensis*.

**DELTHYRIS Plicatus** Owen. See *Spirifer (Delthyris) vanuxemi*.

**DELTHYRIS RADIATA** Billings. See *Spirifer (Eospirifer) radiatus*.

**DELTHYRIS RUGATINA** Conrad. See *Spirifer (Eospirifer) sulcata*.

**DELTHYRIS? RUGICOSTA** Schuchert. See *Spirifer (Delthyris) rugicosta*.

**DELTHYRIS SINUATUS** Hall. See *Bilobites bilobus*.

**DELTHYRIS STAMINEA** Hall. See *Spirifer (Delthyris) crispus*.

**DELTHYRIS SULCATA** Hisinger. See *Spirifer (Delthyris) sulcata*.

***Deltoceras* Hyatt.**

Genotype: *D. planum* Hyatt.

*Deltoceras* Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 449.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 772.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 480.

***Deltoceras planum* Hyatt.**

*Deltoceras planum* Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 450.

Canadian (Quebec): Port au Choix, Newfoundland.

***Deltoceras vaningeni* Ruedemann.**

*Deltoceras vaningeni* Ruedemann, Bull. New York State Mus., 90, 1906, p. 480, pls. 25-28, figs. 39-41.

Chazyan (Crown Point): Valcour Island, New York.

**DEMIRASTRITES URCEOLUS** Eisel. See *Monograptus urceolus*.

***Dendroclonella* Rauff.**

Genotype: *D. rugosa* Rauff.

*Dendroclonella* Rauff, Palaeontographica, 41, 1895, p. 252.

***Dendroclonella rugosa* Rauff.**

*Dendroclonella rugosa* Rauff, Palaeontographica, 41, 1895, p. 252, pl. 18, figs. 8, 3-6; pl. 24, fig. 1.

Niagaran (Brownsport): Perry County, Tennessee.



**DENDROCRINUS** Hall.Genotype: *D. longidactylus* Hall.

*Dendrocrinus* Hall, Pal. New York, 2, 1852, p. 193.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 317.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 264; Geol. Surv. Canada, dec. 4, 1859, p. 35, fig. 14.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 208.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 20.—Zittel, Handb. Pal., 1, 1879, p. 361.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 285, 289, 298 (Rev. Pal., pt. 1, pp. 62, 66, 75); *ibid.*, 1885, pp. 115, 116; *ibid.*, 1890, pp. 380-384; Amer. Jour. Sci., 3d ser., 26, 1883, p. 376, fig. 5.—Miller, N. A. Geol. Pal., 1889, p. 238, fig. 282.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 15; pl. 15, fig. 4; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 179, fig. 96.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 155.—Zittel, Grundzuge Pal., 1, 1910, p. 132.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 711.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504.—Springer, Geol. Surv. Canada, Mem. 15P, 1911, p. 29; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 215.

***Dendrocrinus acutidactylus*** Billings.

*Dendrocrinus acutidactylus* Billings, Geol. Surv. Canada, Rep. Progr., 1853-1856, 1857, p. 266; Geol. Surv. Canada, dec. 4, 1859, p. 37, pl. 3, figs. 2a, b.

Trenton (Curdsville): Montreal, Quebec; Mercer County, Kentucky.

***Dendrocrinus alternatus*** (Hall).

*Poteriocrinus alternatus* Hall, Pal. New York, 1, 1847, pp. 83, 316, pl. 28, figs. 1a-f.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 224, fig. 77.

*Cyathocrinus?* *alternatus* Hall, Pal. New York, 1, 1847, p. 316.

*Homocrinus alternatus* Hall, Pal. New York, 2, 1852, p. 185.

*Dendrocrinus alternatus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).

Trenton: Turin, Lowville, Middleville, etc., New York.

**DENDROCRINUS ANCILLA** Hall. See *Homocrinus ancilla*.

**DENDROCRINUS ANGULATUS** Billings. See *Palæocrinus angulatus*.

***Dendrocrinus angustatus*** (Meek and Worthen).

*Homocrinus angustatus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1870, p. 30; Geol. Surv. Illinois, 6, 1875, p. 492, pl. 23, fig. 8.

*Dendrocrinus angustatus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).

Richmond (Maquoketa): Mount Carroll, Illinois.

***Dendrocrinus caduceus*** (Hall).

*Poteriocrinus* (*Dendrocrinus*) *caduceus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 208, pl. 5, figs. 7, 8 (adv. sheets 1866, p. 3; 1871, pl. 1, figs. 7, 8).

*Poteriocrinites* (*Dendrocrinus*) *caduceus* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 26, pl. 3 bis, figs. 1a-d.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 738, figs.

*Dendrocrinus caduceus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76); *ibid.*, 1890, p. 392, pl. 10, fig. 11.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505, fig. 1819.

Richmond (Waynesville-Liberty): Near Lebanon, etc., Ohio.

***Dendrocrinus casel*** Meek.

Pentacrinite Christy, Letters on Geology, 1848, pl. 2.

*Dendrocrinus Casei* Meek, Amer. Jour. Sci., 3d ser., 2, 1871, p. 295.—Foerste, Amer. Geol., 12, 1893, pp. 270, 340.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 35,



**Dendrocrinus casei**—Continued.

fig. 13; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 120, fig. 26, 3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 717, pl. 4, figs. 2, 2b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505.

Poteriocrinites (Dendrocrinus) Casei Meek, Geol. Surv. Ohio, 1, pt. 2, 1873, p. 28, pl. 3 bis, figs. 2a-c.

Poteriocrinites (Dendrocrinus) caseyi Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 739, fig.

Richmond (Whitewater): Richmond, Indiana; Oxford, etc., Ohio.

**Dendrocrinus celsus** Ringueberg.

Dendrocrinus celsus Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1888, p. 132, pl. 7, fig. 3.

Clinton (Rochester): Lockport, New York.

**Dendrocrinus cincinnatiensis** (Meek).

Poteriocrinites (Dendrocrinus) Cincinnatiensis Meek, Proc. Acad. Nat. Sci. Philadelphia, 1871, p. 312; Geol. Surv. Ohio, Pal., 1, 1873, p. 20, pl. 3 bis, figs. 5a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 739, figs.

Dendrocrinus Cincinnatiensis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505, fig. 1818.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

DENDROCRINUS CONJUGANS Billings. See Cupulocrinus conjugans.

DENDROCRINUS CURTUS Ulrich. See Merocrinus curtus.

DENDROCRINUS CYLINDRICUS Billings. See Cupulocrinus conjugans.

**Dendrocrinus dyeri** (Meek).

Poteriocrinites (Dendrocrinus) Dyeri, Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 310; Geol. Surv. Ohio, Pal., 1, 1873, p. 24, pl. 3 bis, figs. 3a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 739, figs.

Dendrocrinus Dyeri Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).

Trenton (Upper): River quarries, Covington, Kentucky.

**Dendrocrinus erraticus** Miller.

Dendrocrinus erraticus Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 316, pl. 8, figs. 1, 1a.

Richmond: Drift at Cincinnati, Ohio.

**Dendrocrinus gracilis** (Hall).

Poteriocrinus gracilis Hall (not McCoy), Pal. New York, 1, 1847, p. 84, pl. 28, figs. 2a-f.

Poteriocrinus subgracilis D'Orbigny, Prodrôme Pal., 1, 1849, p. 23.

Homocrinus gracilis Hall, Pal. New York, 2, 1852, p. 158.

Poteriocrinites gracilis Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 21, footnote.

Dendrocrinus gracilis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).

Trenton: Middleville, New York.

**Dendrocrinus gregarius** Billings.

Dendrocrinus gregarius Billings, Geol. Surv. Canada, Rep. Progr. 1853-1856, 1857, p. 265; Geol. Surv. Canada, dec. 4, 1859, p. 36, pl. 3, figs. 1a-c.

Trenton: Ottawa, Ontario.

**DENDROCRINUS HUMILIS** Billings. See *Cupulocrinus humilis*.

**DENDROCRINUS JEWETTHI** Billings. See *Cupulocrinus jewetti*.

**DENDROCRINUS LATIBRACHIATUS** Billings. See *Cupulocrinus latibrachiatus*.

**Dendrocrinus longidactylus** Hall.

*Dendrocrinus longidactylus* Hall, Pal. New York, 2, 1852, p. 193, pl. 43, figs. 1a-k; pl. 42, figs. 7a, b.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 317, pl. 100, fig. 14.—Bather, *Geol. Mag.*, dec. 4, 6, 1899, p. 35, fig. 12; *Treatise on Zool.*, pt. 3, Echinoderma, London, 1900, p. 120, figs. 26, 2.—Springer, *Mem. Geol. Surv. Canada*, 15P, 1911, p. 29, fig. 1.

Clinton (Rochester): Lockport, New York.

**Dendrocrinus modestus** Safford.

*Dendrocrinus modestus* Safford, *Geol. Tennessee*, 1869, p. 285 (not defined).  
Stones River (Lebanon): Central basin of Tennessee.

**Dendrocrinus navigiolum** Miller.

*Dendrocrinus navigiolum* Miller, *Jour. Cincinnati Soc. Nat. Hist.*, 3, 1880, p. 235, pl. 7, figs. 5, 5a (6, 6a).

Eden (Fulton): First Ward, Cincinnati, Ohio.

**Dendrocrinus? nodobrachiatus** Ringueberg.

*Dendrocrinus? nodobrachiatus* Ringueberg, *Annals New York Acad. Sci.*, 5, 1890, p. 303, pl. 3, fig. 6.

Niagaran (Lockport-Gasport member): Lockport, New York.

**DENDROCRINUS NUCLEUS** Hall. See *Botryocrinus nucleus*.

**Dendrocrinus oswegoensis** Meek and Worthen.

*Dendrocrinus Oswegoensis* Meek and Worthen, *Geol. Surv. Illinois*, 3, 1868, p. 333, pl. 4, fig. 4.—Miller, *N. A. Geol. Pal.*, 1889, p. 238, fig. 284.

Richmond (Maquoketa): Oswego, Kendall County, Illinois.

**DENDROCRINUS POLYDACTYLUS** Wachsmuth and Springer. See *Cupulocrinus polydactylus*.

**Dendrocrinus posticus** (Hall).

*Poteriocrinus posticus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 209, pl. 5, figs. 5, 6 (extract 1871, pl. 1, figs. 5, 6.).

*Poteriocrinites* (*Dendrocrinus*) *posticus* Meek, *Geol. Surv. Ohio*, Pal., 1, 1873, p. 22, pl. 3 bis, figs. 4a-c.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 740, figs.

*Dendrocrinus posticus* Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1879, p. 300 (*Rev. Pal.*, pt. 1, p. 77).

Richmond (Waynesville-Liberty): Southwestern Ohio.

**Dendrocrinus proboscidiatus** Billings.

*Dendrocrinus proboscidiatus* Billings, *Geol. Surv. Canada*, Rep. Progr. for 1853-56, 1857, p. 267; *Geol. Surv. Canada*, dec. 4, 1859, p. 38, pl. 3, figs. 3a-c; *Ottawa Nat.*, 1, 1887, p. 53, pl. figs.—Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 37, (loc. occ.)

Trenton (Curdsville): Montreal, Quebec; Kirkfield, Ontario.

**Dendrocrinus retractilis** Walcott.

*Dendrocrinus retractilis* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 211, pl. 17, fig. 4.

Trenton: Trenton Falls, New York.



**Dendrocrinus rusticus** Billings.

*Dendrocrinus rusticus* Billings, Geol. Surv. Canada, Rep. Prog. for 1853-56, 1857, p. 270; Geol. Surv. Canada, dec. 4, 1859, p. 41, pl. 3, figs. 7a, 7b.

Trenton: Ottawa, Ontario.

**DENDROCRINUS (HOMOCRINUS) SCOPARIUS** Wachsmuth and Springer. See *Lasiocrinus scoparius*.

**Dendrocrinus similis** Billings.

*Dendrocrinus similis* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 267; Geol. Surv. Canada, dec. 4, 1859, p. 40.

Trenton: Ottawa, Ontario.

**Dendrocrinus tener** Billings.

*Dendrocrinus tener* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 9.

Richmond (Charleton): West End, Anticosti.

Observation.—Not recognized. Twenhofel reports the specimen as too poor for determination.

**DENDROCYSTIS** Haeckel. See *Dendrocystites* Barrande.

**DENDROCYSTITES** Barrande.

Genotype: *D. sedgwicki* Barrande

?*Syringocrinus* Billings, Canadian Org. Rem., dec. 4, 1859, p. 65.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 411 (Rev. Pal., pt. 2, p. 237).—Miller, N. A. Geol. Pal., 1889, p. 285.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 203.—Zittel, Grundzuge Pal., 1, 1910, p. 156.

*Dendrocystites* Barrande, Extraits du Syst. Silur., 1887, p. 219; Syst. Silur. Boheme, 7, p. 142.—Jaekel, Zeitschr. deutsch. geol. Gesell., 52, 1901, p. 673.

*Dendrocystis* Haeckel, Amphor. und Cystoid., 1, 1900, p. 47.—Delage and Herouard, Zool. Concrete, 3, 1904, p. 408.—Bather, Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 371, text figs. 6-9.

**Dendrocystites? paradoxa** (Billings).

*Syringocrinus paradoxicus* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 65, pl. 10, fig. 14.

*Syringocrinus paradoxus* Bather, Treatise on Zool., Echinoderma, 1900, p. 48.

*Dendrocystis(?) paradoxa* Bather, Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 397, fig. 13.

Trenton: Beauport, near Quebec, Canada.

Observation.—See Bather (op. cit., 1913) for discussion of *Syringocrinus* and *S. paradoxa*.

**DENDROGRAPTUS** Hall.

Genotype: *D. hallianus* Prout.

*Dendrograptus* Hall, Geol. Surv. Canada for 1857, Rep. Progr., 1858, p. 143; Rep. Geol. Surv. Wisconsin, 1, 1862, p. 21; Geol. Surv. Canada, dec. 2, p. 126, 127, figs. a, b, c.—Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 142.—Carruthers, Geol. Mag., 5, 1868, p. 73, 130.—Hall, 20th Rep. New York State Cab. Hist., 1868, p. 218; rev. ed., p. 252.—Nicholson, Mon. British Grapt., 1872, p. 127.—Zittel, Handb. Pal., 1, 1879, p. 289.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 16; Trans. Acad. Sci. St. Louis, 4, 1884, p. 262, 566.—Miller, N. A. Geol. Pal., 1889, p. 184.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 151.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 165.—Roemer and Frech, Leth. geog., 1, Theil, Leth. Pal., 1, 3 Lief., 1897, p. 577.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. xli.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 578, 579.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 26.—Ruedemann, Zittel-Eastman Textb., Pal., 2d. ed., 1913, p. 128.



**DENDROGRAPTUS ARUNDINACEUS** Gurley. See *Mastigograptus arundinaceus*.

**DENDROGRAPTUS COMPACTUS** Walcott. See *Callograptus compactus*.

**Dendrograptus dawsoni** Spencer.

*Dendrograptus dawsoni* Spencer, Canadian Nat., 10, 1882, p. 165; Trans. Acad. Sci. St. Louis, 4, 1884, p. 568, pl. 1, fig. 5; Bull. Mus. Univ. Missouri, 1, 1884, p. 18, pl. 1, fig. 5.—Gurley, Jour. Geol., 4, 1896, pp. 94, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 6, fig. 1.

Niagaran dolomite: Hamilton, Ontario.

**DENDROGRAPTUS?** (*CALLOGRAPTUS?*) *diffusus* Hall. See *Callograptus diffusus*.

**Dendrograptus divergens** Hall.

*Dendrograptus divergens* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 129, pl. 17, figs. 3, 4.—Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 664, pl. 36, figs. 6a, b.

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

**Dendrograptus dubius** Miller.

*Dendrograptus simplex* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 567, pl. 1, fig. 4; Bull. Mus. Univ. State Missouri, 1, 1884, p. 17, pl. 1, fig. 4.

*Dendrograptus dubius* Miller, N. A. Geol. Pal., 1889, p. 184.—Gurley, Jour. Geol., 4, 1898, pp. 94, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 7, 8, figs. 2, 8.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus erectus** Hall.

*Dendrograptus erectus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 130, pl. 17, fig. 7.

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

**Dendrograptus flexuosus** Hall.

*Dendrograptus flexuosus* Hall, Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 127, pl. 17, figs. 1, 2, p. 128, fig. 3; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 177, fig. 9; rev. ed., 1870, p. 209, fig. 9, p. 224.—Hopkinson and Lapworth, Quar. Jour. Geol. Soc., 31, 1875, p. 662, pl. 36, figs. 3a–3d.—Roemer and Frech, Leth. Pal., 1, 1897, p. 578.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 579, pl. 4, figs. 5, 6, 8–10.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 26, fig. 37.

*Dendrograptus cf. gracilis* Ruedemann, New York State Pal. Ann. Rep., 1902, p. 555.

Canadian: Point Levis, Quebec (*Levis*, *Diplograptus dentatus* zone); Deepkill, New York (*Deepkill*, *D. dentatus* zone). Lower and Middle Arenig of Wales.

**Dendrograptus fluitans** Ruedemann.

*Dendrograptus n. sp.* Ruedemann, New York State Pal. Ann. Rep., 1902, p. 555.

*Dendrograptus fluitans* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 582–583, pl. 4, figs. 11, 12.

Canadian (*Deepkill*): Deepkill, Rensselaer County, New York (*Tetragraptus* zone).

**Dendrograptus frondosus** Spencer.

*Dendrograptus frondosus* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 568, pl. 1, fig. 6; Bull. Mus. Univ. State Missouri, 1, p. 18, pl. 1, fig. 6, 6a.—Gurley, Jour. Geol., 4, 1896, pp. 64, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 8, fig. 7.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus fruticosus Hall.**

*Dendrograptus fruticosus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 131, pl. 17, figs. 8, 9.

Canadian (Levis, *Didymograptus dentatus* zone): Point Levis, Quebec.

**Dendrograptus gracilis Hall.**

*Dendrograptus gracilis* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 132, pl. 18, figs. 5-6; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 199, pl. 4, fig. 11; rev. ed., 1870, p. 230, pl. 4, fig. 11; p. 224.

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

*DENDROGRAPTUS* cf. *GRACILIS* Ruedemann. See *Dendrograptus flexuosus*.

*DENDROGRAPTUS GRACILIS* var. *CRASSA* James. See *Buthotrephis gracilis crassa*.

*DENDROGRAPTUS* (*PSILOPHYTON*) *GRACILLIMUS* Walcott. See *Mastigograptus gracillimus*.

*DENDROGRAPTUS GRACILLIMUS* var. *INTERMEDIA* James. See *Buthotrephis gracilis intermedia*.

*DENDROGRAPTUS LINEARIS* Carruthers. See *Pleurograptus linearis*.

*DENDROGRAPTUS NOVELLUS* Hall. See *Chaunograptus novellus*.

**Dendrograptus ontarioensis Bassler.**

*Dendrograptus ontarioensis* Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 12, 13, pl. 1, fig. 4, fig. 12.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus phainotheca Gurley.**

*Dendrograptus phainotheca* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 11, 12, pl. 2, fig. 2; fig. 11.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus prægracilis Spencer.**

*Dendrograptus prægracilis* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 569, pl. 1, fig. 7; Bull. Mus. Univ. State Missouri, 1, 1884, p. 19, pl. 1, fig. 7.—Gurley, Jour. Geol., 4, 1896, pp. 95-308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 9, pl. 2, fig. 3, text figs. 4, 10.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus? problematicus (Spencer).**

*Inocaulis(?) problematica* Spencer, Canadian Nat., n. s., 8, 1878, p. 458; *ibid.*, 10, 1882, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 36, pl. 5, fig. 3; Trans. Acad. Sci. St. Louis, 4, 1884, p. 564, pl. 5, fig. 3.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.

*Dendrograptus? problematicus* Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 10, pl. 1, figs. 1, 2, text fig. 6.

*Dendrograptus* sp. Grant, Jour. Proc. Hamilton Assoc., 16, 1900, p. 102, fig.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus ramosus Spencer.**

*Dendrograptus ramosus* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 567, pl. 1, fig. 3; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 17, pl. 1, fig. 3, 3a.—Gurley, Jour. Geol., 4, 1896, pp. 95, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 8, pl. 1, fig. 3; text figs. 3, 9.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus rectus** Ruedemann.

*Dendrograptus rectus* Ruedemann, Mem. New York State Mus., 11, 1908, p. 145, pl. 8, fig. 2, text fig. 51.

Upper Clinton: Clinton, Oneida County, New York.

**Dendrograptus serpens** Hopkinson.

*Dendrograptus serpens* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 665, pl. 37, fig. 3.

*Dendrograptus* cf. *serpens* Gurley, Jour. Geol., 4, 1896, p. 84.

Canadian: Europe; Summit, Nevada.

*DENDROGRAPTUS SIMPLEX* Spencer. See *Dendrograptus dubius*.

*DENDROGRAPTUS SIMPLEX* Walcott. See *Mastigograptus simplex*.

**Dendrograptus spinosus** Spencer.

*Dendrograptus spinosus* Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, p. 569, pl. 1, fig. 8; Bull. Mus. Univ. State Missouri, 1, pp. 14, 19, pl. 1, fig. 8.—Gurley, Jour. Geol., 4, 1896, pp. 95, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 10, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

**Dendrograptus striatus** Hall.

*Dendrograptus striatus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 129, pl. 17, figs. 5-6.

Canadian (Levis, *Didymograptus dentatus* zone): Point Levis, Quebec.

**Dendrograptus(?) succulentus** Ruedemann.

*Dendrograptus* n. sp. Ruedemann, New York State Pal. Ann. Rep., 1902, p. 570.

*Dendrograptus(?) succulentus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 581-582, pl. 4, figs. 1-4, text figs. 16, 17.

Canadian: Deepkill, Rensselaer County, New York (*Deepkill*, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *D. dentatus* zone).

*DENDROGRAPTUS TENUIRAMOSUS* Walcott. See *Mastigograptus tenuiramosus*.

**Dendrograptus unilateralis** Gurley.

*Dendrograptus unilateralis* Gurley, Jour. Geol., 4, 1896, p. 84.

Trenton (Magog): Magog, Quebec.

**DEOCRINUS** Hudson.

Genotype: *Rhodocrinus asperatus* Billings.

*Deocrinus* Hudson, Bull. New York State Mus., 107, 1907, p. 121.

**Deocrinus asperatus** (Billings).

*Rhodocrinus asperatus* Billings, Geol. Surv. Canada, dec. 4, 1859, p. 27, pl. 1, figs. 4a-4e.

*Archæocrinus asperatus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 301.

*Deocrinus asperatus* Hudson, Bull. New York State Mus., 107, 1907, p. 122, fig. 5, pl. 8.

Chazy (Aylmer): Near Montreal, Quebec.

**DERMATOSTROMA** Parks.

Genotype: *Stromatopora papillatum* James.

*Dermatostroma* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 29.

**Dermatostroma canaliculatum** Parks.

*Dermatostroma canaliculatum* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 35, pl. 24, figs. 8, 9.

Richmond (Waynesville): Waynesville, Ohio.

*Holotype*.—Cat. No. 40082, U.S.N.M.



**Dermatostroma cavernosum** Parks.

*Dermatostroma cavernosum* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 36, pl. 24, fig. 12-13.

Trenton (Catheys): Five miles east of Mount Pleasant, Tennessee.

*Holotype*.—Cat. No. 49508, U.S.N.M.

**Dermatostroma corrugatum** (Foerste).

*Labechia*(?) *corrugata* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 86, pl. 1, fig. 11.

*Dermatostroma corrugatum* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 34, pl. 24, figs. 7, 10, 11, 14.

Richmond (Whitewater): Near Wilmington, Ohio.

**Dermatostroma glyptum** (Foerste).

*Labechia corrugata glypta* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 87.

*Dermatostroma glyptum* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 33, pl. 24, figs. 4, 5, 6.

Richmond (Whitewater): Near Wilmington, Ohio.

**Dermatostroma papillatum** (James).

*Stromatopora papillata* James, Paleontologist, 1, 1878, p. 1.—Mickleborough and Wetherby, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 81.—James, *ibid.*, 9, 1886, p. 251; *ibid.*, 15, 1892, p. 91.

*Dermatostroma papillatum* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 30, pl. 23, figs. 8-10.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky Tennessee; Virginia.

**Dermatostroma papillatum diversum** Parks.

*Dermatostroma papillatum diversum* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 31, pl. 23, fig. 12.

Maysville (Corryville): Cincinnati, Ohio.

*Holotype*.—Cat. No. 56844, U.S.N.M.

**Dermatostroma scabrum** (James).

*Stromatopora scabra* James, Paleontologist, 3, 1879, p. 18.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 251; *ibid.*, 1892, p. 91.

*Labechia scabra* Harper and Bassler, Cat. Fossils, Trenton and Cincinnati Periods Vicinity Cincinnati, 1896, p. 3.

*Dermatostroma scabrum* Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 31, pl. 24, figs. 1-3.

Eden-Richmond: Lebanon, Cincinnati, etc., Ohio; Indiana; Kentucky; Tennessee.

*Plesiotype*.—Cat. No. 40080, U.S.N.M.

**Dermatostroma tyronense** Foerste.

*Dermatostroma tyronensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 139, pl. 10, figs. 5a, b.

Black River (Lowville): High Bridge, Kentucky.

**DESMOGRAPTUS** Hopkinson.

Genotype: *D. cancellatus* Hopkinson.

*Desmograptus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 668.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 185.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 609.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 26.—Ruedemann, Zittel-Eastman Textb. Pal., 1913, p. 128.

**Desmograptus cancellatus** (Hopkinson).

Dictyograptus (Desmograptus) cancellatus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 668, pl. 36, figs. 11a, 11b.

Dictyonema (Desmograptus) cancellatum Ruedemann, New York State Pal., Ann. Rep. 1902, p. 570.

Desmograptus cancellatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 610, 611, pl. 3, figs. 5-8, 31.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 26, fig. 36.

Desmograptus macrodictyum Gurley, Jour. Geol., 4, 1896, p. 83.

Lower Ordovician: St. Davids, Wales (Lower Arenig); Point Levis, Quebec (Levis); Deepkill, Rensselaer County, New York (Deepkill, Diplograptus dentatus zone).

**Desmograptus intricatus** Ruedemann.

Dictyonema (Desmograptus) n. sp. Ruedemann, New York State Pal., Ann. Rep. 1902, p. 570.

Desmograptus intricatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 611, 612, pl. 3, figs. 1-4, text figs. 32, 33; fig. 30, p. 609.

Canadian (Deepkill-Diplograptus dentatus zone): Deepkill, Rensselaer County, New York.

**DESMOGRAPTUS MACRODICTYUM** Gurley. See *Desmograptus cancellatus*.

**Desmograptus pergracilis** (Hall and Whitfield).

Dictyonema pergracilis Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 181 (abstract, p. 1); 27th Rep. New York State Cab. Nat. Hist., 1875, pl. 9, fig. 38.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 577; Bull. Mus. Univ. State Missouri, 1, 1884, p. 27.—Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 107.—Pocta, Syst. Sil. Boheme, 8, pt. 1, 1894, p. 193.—Gurley, Jour. Geol., 4, 1896, p. 308.

Desmograptus pergracilis Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 179.

Niagaran (Louisville): Louisville, Kentucky.

**Desmograptus tenuiramosus** Ruedemann.

Desmograptus tenuiramosus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 177, 178, pl. 1, fig. 2, text figs. 84, 85.

Chazy (Normanskill): Glenmont, Albany County, New York.

**DIABOLOCRINUS** Wachsmuth and Springer.

Genotype: *D. perplexus* Wachsmuth and Springer.

Diabolocrinus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, pp. 211, 249.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 200.—Zittel, Grundzuge Pal., 1, 1910, p. 161.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 188.

**Diabolocrinus asperatus** (Miller and Gurley).

Archæocrinus asperatus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 19, pl. 2, figs. 7-9.—Miller, Sec. App., N. A. Geol. Pal., 1897, p. 734, figs. 1296, 1297.

Diabolocrinus hieroglyphicus Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 252 pl. 10, fig. 5a-c.

Chazy (Ottosee): Near Knoxville, Tennessee.

**DIABOLOCRINUS HIEROGLYPHICUS** Wachsmuth and Springer. See *Diabolocrinus asperatus*.



**Diaboloerinus perplexus** Wachsmuth and Springer.

*Diaboloerinus perplexus* Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 250, pl. 11, fig. 1a, b.

Chazy (Ottosee): Near Knoxville, Tennessee.

**Diaboloerinus vesperalis** (White).

*Rhodocrinus vesperalis* White, Proc. U. S. Nat. Mus., 2, 1880, p. 259, pl. 1, figs. 11, 12; 12th Ann. Rep. U. S. Geol. Surv. Terr., 1883, p. 129, pl. 35, figs. 4a, b.

*Diaboloerinus vesperalis* Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, pp. 251, 262, pl. 11, figs. 1c-, d.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 104.

*Gilbertsocrinites americanus* Troost, Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

*Lyriocrinus sculptilus* Miller (not Hall, 1851), Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 83, pl. 3, figs. 6a, b; p. 117 (corrected to *L. sculptus* on private edition).

*Archæocrinus sculptus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 320 (Rev. Pal., pt. 3, sec. 1, 1885, p. 98).—Miller, N. A. Geol. Pal., 1889, p. 225, fig. 250.

Chazy (Ottosee): Near Knoxville, Tennessee. Erroneously cited by White (1880) from the Coal Measures near Humboldt, Kansas, and by Miller (1882) from the Helderbergian of Tennessee.

*Holotype* and *plesiotype*.—Cat. Nos. 39970, 80321, U.S.N.M.

**DIAGONIELLA** Rauff. See *Protospongia* Salter.

**DIAMESOPORA** Ulrich (part). See *Coeloclema* Ulrich.

**DIAMESOPORA** Hall.

Genotype: *D. dichotoma* Hall.

*Diamesopora* Hall, Pal. New York, 2, 1852, p. 158 (not defined).—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 170.—Hall and Simpson, Pal. New York, 6, pp. 15, 19.—Miller, N. A. Geol. Pal., 1889, p. 300.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 54, 229.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 175; Bull. New York State Mus., 45, 1901, p. 175.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 62.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 165.

*Diamesopora communis* Ulrich. See *Coeloclema commune*.

**Diamesopora dichotoma** Hall.

*Diamesopora dichotoma* Hall, Pal. New York, 2, 1852, p. 158, pl. 40, figs. 3a-d.—Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 118.—Grabau, Bull. New York State Mus. 45, 1901, p. 175, fig. 78; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 175, fig. 78.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 62, pl. 21, figs. 12, 13; pl. 24, figs. 28-30.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 166, fig. 216a, b.

Clinton (Rochester): Lockport, Rochester, etc., New York; Hamilton and Grimsby, Ontario.

*Plesiotype*.—Cat. No. 35759, U.S.N.M.

**Diamesopora infrequens** (Hall).

*Trematopora infrequens* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 10, figs. 13, 14 (in error for 3, 4); *ibid.*, Mus. ed., 1879, p. 111, pl. 10, fig. 3 (in part), 4; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 232, pl. 9, figs. 3 (in part), 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890 p. 1200, figs.

*Coeloclema infrequens* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 258.

*Diamesopora infrequens* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.

Niagaran (Waldron): Waldron, etc., Indiana; Newsom, Tennessee.



**Diamesopora osculum** (Hall).

- Trematopora osculum Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 10, figs. 3-12 (3 and 4 in error); *ibid.*, Mus. ed., 1879, p. 110, pl. 10, figs. 5-8, 11-14; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 231, pl. 9, figs. 5-8, 11-14.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1201, fig.  
 Cœloclema osculum Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 258.  
 Diamesopora osculum Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.  
 Niagaran (Waldron): Waldron, etc., Indiana; Newsom, Tennessee.

DIAMESOPORA OWENI Ulrich. See Cœloclema oweni.

**Diamesopora subimbricata** (Hall).

- Trematopora subimbricata Hall, 28th Ann. Rep. New York State Mus., Mus. ed., 1879, pl. 10, figs. 9, 10; Trans. Albany Inst., 10, 1883, p. 60 (abstract, 1879, p. 4); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 234, pl. 9, figs. 9, 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1202, figs.  
 Cœloclema imbricata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1882, p. 258.  
 Diamesopora subimbricata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.  
 Niagaran (Waldron): Waldron, Indiana.

DIAMESOPORA TRENTONENSIS Ulrich. See Cœloclema trentonense.

**Diamesopora? tubulosa** (Hall).

- Trematopora tubulosa Hall, Pal. New York, 2, 1852, p. 151, pl. 40A, figs. 3a-c.  
 Diamesopora tubulosa Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 119.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.  
 Lower Clinton: Wayne County, New York.

DIAMESOPORA VARIA Ulrich. See Chilotrypa varia.

DIAMESOPORA VAUPELI Ulrich. See Cœloclema alternatum.

**DIANULITES** Eichwald.

Genotype: *D. bicornis* Eichwald.

- Dianulites Eichwald, Zool. Spec., 1, 1829, p. 180; Leth. Rossica, 1, 1860, p. 487.—Dybowski, Die Chætetiden der Ostbaltischen Silur-form., 1877, p. 14.—Zittel, Handb. Pal., 1, 1880, p. 616.—Nicholson, Genus Monticulipora, 1881, pp. 20, 155.—Waagen and Wentzel, Pal. Indica, 13th ser., 1886, p. 874.—Simpson, 14th Ann. Rep. State Geol. New York for the year 1894, 1897, p. 587.—Miller, N. A. Geol. Pal., 2d App. 1897, p. 728.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 230.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 226-229; Zittel-Eastman Textb. Pal., 1913, p. 335.  
 Hexaporites Pander, Beitr. zur Geogn. d. russ. Reichs., 1830, p. 106, pl. 1, fig. 5; pl. 28, fig. 8.

DIANULITES DISCOIDEA Miller. See Mesotrypa discoidea.

DIANULITES DUBIA Miller. See Diplotrypa? dubia.

DIANULITES LIMITARIS Miller. See Diplotrypa limitaris.

DIANULITES NEGLECTA Miller. See Diplotrypa neglecta.

DIANULITES PATELLA Miller. See Mesotrypa patella.

**Dianulites petropollitanus** Dybowski.

- Dianulites petropollitana Dybowski, Die Chætetiden der Ostbaltischen Silur-form., 1877, p. 24, pl. 1, figs. 4, 5.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 232-237, pl. 2, figs. 4-6a; pl. 10, figs. 7-11; text figs. 129-132.  
 Hexaporites Pander, Beitr. Geogn. russ. Reiches., 1830, p. 106, pl. 1, fig. 5; pl. 28, fig. 8.

**Dianulites petropolitanus**—Continued.

Hexaporites fungiformis Leuchtenberg in Eichwald Geog. Russ., 1846, p. 370.—Eichwald, Leth. Rossica, 1, 1860, p. 478.

Dianulites petropolitanus var. hexaporites Dybowski, Die Chætetiden der Ostbaltischen Silurform., 1877, p. 30, pl. 1, figs. 6, 6a.

Monotrypa (Chætetes?) cumulata Ulrich, Geol. Minnesota, 3, pt. 1, 1893, p. 307, pl. 27, figs. 26, 27.

Middle Ordovician: Esthonia, Russia; Goodhue County, Minnesota (Prosser); Ottawa, Ontario.

*Plesiotypes*.—Cat. Nos. 26906, 57339, 57340, U.S.N.M. (Holotype of *M. cumulata*).

**DIANULITES PETROPOLITANUS** var. **HEXAPORITES** Dybowski. See *Dianulites petropolitanus*.

**DIANULITES QUEBECENSIS** Miller. See *Mesotrypa quebecensis*.

**DIANULITES ROTUNDA** Miller. See *Mesotrypa rotunda*.

**DIANULITES SELKIRKENSIS** Miller. See *Mesotrypa selkirkensis*.

**DIAPHOROSTOMA** Fischer.

Genotype: *Platyostoma ventricosum* Conrad.

*Platyostoma* Conrad (not Meigen, 1903), Jour. Acad. Nat. Sci. Philadelphia, 7, 1842, p. 275.—Hall, Pal. New York, 2, 1852, pp. 103, 286; *ibid.*, 3, 1859, pp. 293, 299.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 117.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1880, p. 103.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 61.—Zittel, Handb. Pal., 2, 1882, p. 217.—Koken, Neues Jahrb. Min., Geol., 6, 1889, pp. 349, 468, 470.—Miller, N. A. Geol. Pal., 1889, p. 418.—Nettelroth, Kentucky, Foss. Shells, Geol. Surv. Kentucky, 1889, p. 183.—Koken, Die Leitfossilien, Leipzig, 1896, p. 128.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 274.

*Diaphorostoma* Fischer, Man. Conch., 1885.—Grabau, Bull. New York State Mus., 45, 1, 1901, p. 211; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 211.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 679.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 54.

**Diaphorostoma auriforme** (Hall).

Capulus auriformis Hall, Pal. New York, 1, 1847, p. 31, pl. 6, figs. 9a, b; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67.

*Stomatia auriformis* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 157.

*Platyostoma auriforme* Raymond, Ann. Carnegie Mus., 4, 1908, p. 217.

Chazyan or Trenton: Galway, New York.

**Diaphorostoma brownsportense** (Foerste).

*Platyceras brownsportensis* Foerste, Jour. Geol., 11, 1903, p. 709.

*Diaphorostoma brownsportensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 64, pl. 1, fig. 14.

Niagaran (Brownsport): Brownsport Furnace, Cerro Gordo, and Bath Springs, Tennessee.

**Diaphorostoma campanulatum** (Winchell and Marcy).

*Platyceras campanulatum* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 99, pl. 2, fig. 16.

Niagaran (Racine): Chicago, Illinois.

**Diaphorostoma cliftonense** Foerste.

*Diaphorostoma cliftonensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 63, pl. 3, figs. 41A, B; Cincinnati Soc. Nat. Hist. Jour., 21, 1909, p. 30.

Clinton: Clifton, Tennessee (Osgood); Martins, Lewis County, Kentucky (West Union).



**Diaphorostoma hemisphericum** (Hall).

*Euomphalus hemisphericus* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 109, figs. 1, 2; p. 110, tab. 16, figs. 1, 2.

*Straparollus hemisphericus* D'Orbigny, Prodr. Pal., 1, 1849, p. 29 (gen. ref.)

*Platystoma hemispherica* Hall, Pal. New York, 2, 1852, p. 288, pl. 60, fig. 2a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 692, figs.

Clinton (Rochester): Rochester, Lockport, etc., New York.

**Diaphorostoma humile** (Billings).

*Cyclonema humilis* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 56.

Gamachian (Ellis Bay) and Anticostian (Gun River-Chicotte): The Jumpers, etc., Anticosti.

**Diaphorostoma illinoisense** Savage.

*Diaphorostoma illinoisensis* Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 118, pl. 7, fig. 19.

Upper Medinan (Channahon): Will County, Illinois.

**Diaphorostoma niagarense** (Hall).

*Platystoma niagarensis* Hall, Pal. New York, 2, 1852, p. 287, pl. 60, figs. 1a-v.—Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 75, pl. 5, fig. 15.—Hall, Trans. Albany Inst., 4, 1863, p. 227 (loc. occ.); 20th Rep. New York State Cab. Hist., 1868, p. 342, 393 (loc. occ.) (Extras, 1865), rev. ed., 1870, pp. 390, 432; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 28, figs. 1-12; pl. 29, figs. 1-15; pl. 31, fig. 3; Mus. ed., 1879, p. 175, pl. 28, figs. 1-12; pl. 29, figs. 1-15.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 497, pl. 3, figs. 7, 8.—Zittel, Handb. Pal., 2, 1882, p. 217, fig. 297.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1881, p. 318, pl. 29, figs. 1-12; 13?, pl. 30, figs. 1-15.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 97, pl. 13, figs. 3a, b; fig. 22.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 185, pl. 33, fig. 30.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 693, figs.—Miller, N. A. Geol. Pal., 1889, p. 418, fig. 697.—Rowley in Greene, Cont. Indiana Pal., pt. 8, 1901, p. 67, pl. 23, fig. 12.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 483, pl. 57, figs. 3, 4.

*Platystoma* (*Diaphorostoma*) *niagarense* Grabau, Amer. Nat., 36, 1902, p. 939.

*Diaphorostoma niagarense* Grabau, Bull. Buffalo Soc. Nat. Sci., 8, 1901, p. 212, fig. 141; Bull. New York State Mus., 45, 1901, p. 212, fig. 141.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 59, pl. 10, figs. 14-16.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 679, fig. 951.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 102, pl. 6, fig. 1.

*Platyceras* (*Platystoma*) *niagarensis* Foerste, Geol. Surv. Ohio, 7, 1893, p. 553, pl. 25, figs. 3, 22.

*Platyceras* (*Diaphorostoma*) *cornutum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 453, pl. 13, figs. 9-16.

*Strophostylus niagarensis* Keyes, Amer. Nat., 24, 1890, pl. 33, fig. 2; Proc. Iowa Acad. Sci., 1, pt. 2, 1892, p. 25.

Silurian: Lockport, Rochester, etc., New York. As at present identified a widely distributed species in North America ranging from the Brassfield to the Keyser formation of the Helderbergian.

*Plesiotype*.—Cat. No. 53232, U.S.N.M. (Nettelroth).

Observation.—*D. niagarensis* Hall has been identified with *Platyceras cornutum* Hisinger, but until the two have been more closely compared it is preferred to leave them distinct.



**Diaphorostoma niagarense clintonense** (Foerste).

Platyceras Niagarense var. Clintonense Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 554, pl. 37a, fig. 8.

Clinton: Mifflintown, Juniata County, Pennsylvania.

**Diaphorostoma niagarense immaturum** Savage.

Diaphorostoma niagarensis var. immatura Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 55, pl. 2, fig. 3.

Upper Medinan (Girardeau): Near Thebes, Illinois.

**Diaphorostoma niagarense multilineatum** (Calvin).

Platystoma niagarense var. multilineatum Calvin, Bull. Lab. Nat. Hist. State Univ. Iowa, 1, 1890, p. 177, pl. 2, figs. 4a-c.

Niagaran (Waldron): Waldron, Indiana.

**Diaphorostoma perforatum** Whiteaves.

Diaphorostoma perforatum Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 52; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 261, pl. 29, figs. 7, 7a.

Niagaran: Ekwan River, Canada.

**Diaphorostoma plebium** (Hall).

Platystoma plebia Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 28, figs. 14, 15; rev. ed., 1879, p. 175, pl. 28, figs. 14, 15; 11th Ann. Rep. Dep. Geol. Nat. Hist., 1882, p. 319, pl. 29, figs. 14, 15.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 695, figs.

Niagaran (Waldron): Waldron, Indiana.

**Diaphorostoma trigonostoma** (Meek).

Platystoma? trigonostoma Meek, Proc. Acad. Nat. Sci. Philadelphia, 1, 1871, 169.—Miller, N. A. Geol. Pal., 1889, p. 418, fig. 698.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 695, figs.

Platystoma Niagarensis var. trigonostoma Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 185, pl. 16, figs. 3a-c, and text fig.

Xenophora trigonostoma Whitfield, Geol. Wisconsin, 4, 1882, p. 358 (gen. ref.). Niagaran: Yellow Springs, Ohio.

**DIASTOPORA** D'Orbigny (part). See Berenicea Lamouroux.

**DIASTOPORELLA** Vine. See Berenicea Lamouroux.

**DIASTOPORINA** Ulrich.

Genotype: *D. flabellata* Ulrich.

Diastoporina Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 177.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 684.—Ulrich, Geol. Minnesota, 3, 1893, p. 121.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 17.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 595.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 20.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 119.

**Diastoporina flabellata** Ulrich.

Diastoporina flabellata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 178, fig. 5; Geol. Minnesota, 3, 1893, p. 122, pl. 2, figs. 2, 3.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 199, 200 (p. 595).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 120, fig. 178f.

Trenton (Prosser): Cannon Falls and St. Paul, Minnesota.

Holotype.—Cat. No. 43266, U.S.N.M.

*DICELLOCEPHALUS AFFINIS* Matthew. See *Platycolpus affinis*.

*DICELLOCEPHALUS BARABUENSIS* Whitfield. See *Platycolpus barabuensis*.

*DICELLOCEPHALUS BELLI* Matthew. See *Anomocarella belli*.

*DICELLOCEPHALUS(?) CORAX* Matthew. See *Dikelocephalus(?) corax*.

*DICELLOCEPHALUS CRISTATUS* Matthew. See *Conokephalina? cristatus*.

*DICELLOCEPHALUS FINALIS* Walcott. See *Apatokephalus finalis*.

*DICELLOCEPHALUS HARTII* Lesley. See *Dikelocephalus hartii*.

*DICELLOCEPHALUS INEXPECTANS* Walcott. See *Conokephalina inexpectans*.

*DICELLOCEPHALUS MAGNIFICUS* Matthew. See *Hungaia magnifica*.

*DICELLOCEPHALUS MEGALOPS* Matthew. See *Conokephalina megalops*.

*DICELLOCEPHALUS OWENI* Matthew. See *Anomocarella? oweni*.

*DICELLOCEPHALUS PAUPER* Matthew. See *Ptychaspis? pauper*.

*DICELLOCEPHALUS PLANIFRONS* Matthew. See *Anomocarella? planifrons*.

*DICELLOCEPHALUS SESOSTRIS* Matthew. See *Ptychaspis sesostris*.

*DICELLOCEPHALUS TRIBULIS* Walcott. See *Dikelocephalus tribulis*.

*DICELLOGRAPTUS* Hopkinson. See *Dicellograptus* Hopkinson.

**DICELLOGRAPTUS** Hopkinson. Genotype: *Didymograptus elegans* Carruthers.  
*Dicellograptus* Hopkinson, *Geol. Mag.*, 8, 1871, p. 20.

*Dicellograptus* Zittel, *Handb. Pal.*, 1, 1879, p. 300.—Tullberg, *Sveriges Geol. Unders.*, Ser. C, No. 55, 1883, pp. 12, 14.—Herrman, *Geol. Mag.*, dec. 3, 2, 1885, p. 451.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 329.—Wiman, *Bull. Geol. Inst. Univ. Upsala*, 2, pt. 2, 1896, p. 264.—Walther, *Zeits. d. d. geol. Gesell.*, 49, 1897, p. 256.—Roemer and Frech, *Leth. geog.*, *Leth. Pal.*, 1, 3 Lief, 1897, p. 617.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 32.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, pp. 291-293; *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 130.

***Dicellograptus complanatus*** Lapworth.

*Dicellograptus complanatus* Lapworth, *Ann. Mag. Nat. Hist.*, 5th ser., 5, 1880, p. 160, pl. 5, figs. 17a-e.—Tullberg, *Sver. Geol. Unders.*, *Afh. och Upps.*, Ser. C, 50, 1882, p. 18.—Roemer and Frech, *Leth. Pal.*, 1, 1897, p. 618, fig. 183.—Elles and Wood, *Mon. British Grapt.*, 1904, p. 139, pl. 20, figs. 1ad.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 32, figs. 53a, b.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, pp. 294, 295.

Ordovician: Scotland and Ireland (Upper Hartfell); Scania (Trinucleus beds); Arbuckle Mountains, Oklahoma (Sylvan).

*Plesiotype*.—Cat. No. 54267, U.S.N.M.

***Dicellograptus divaricatus*** (Hall).

*Graptolithus divaricatus* Hall, *Pal. New York*, 3, 1859, p. 514, figs. 1-4; *New York State Cab. Nat. Hist.*, 13th Ann. Rep., 1860, p. 58, figs. 1-4; *Geol. Surv. Canada, Can. Org. Rem.*, dec. 2, 1865, p. 14, fig. 19.—Lesley, *Geol. Surv. Pennsylvania, Rep. P 4*, 1889, p. 264, figs.

*Graptolithus (Dicranograptus) divaricatus* Hall, *New York State Cab. Nat. Hist.*, 20th Ann. Rep., 1868, p. 180, fig. 20; rev. ed., 1870, p. 212, fig. 20.



**Dicellograptus divaricatus**—Continued.

*Didymograptus divaricatus* Nicholson, Ann. Mag. Nat. Hist., 5, 1868, p. 351, pl. 7, fig. 4; Mon. British Grapt., 1872, p. 55, text fig. 30.

*Dicellograptus divaricatus* Hopkinson, Geol. Mag., 8, 1871, p. 25, pl. 1, fig. 4.—Hopkinson and Lapworth, Quart. Jour. Geol. Soc., 31, 1875, p. 654, pl. 34, figs. 3a, b.—Lapworth, Roy. Soc. Can. Proc. and Trans., 5, sec. 4, 1886, p. 184.—Walcott, Geol. Soc. Am. Bull., 1, 1890, p. 339.—T. S. Hall, Rec. Geol. Surv. N. S. Wales, 7, pt. 2, 1902, p. 3, pl. 12, fig. 3; pl. 13, fig. 3.—Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 143, pl. 20, figs. 5a, 5b.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32, fig. 53c.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 296–299, pl. 18, figs. 4, 212–214.

*Dicellograptus moffatensis* var. *divaricatus* Lapworth, Belfast Nat. Field Club, Rep. and Proc., 1, pt. 4, 1877; app., p. 141, pl. 7, fig. 10.—Ami, Can. Geol. Surv., Ann. Rep. 3, pt. 2, 1889, p. 60K, 116K.

*Dicranograptus divaricatus* Walcott, Alb. Inst. Trans., 10, 1883, (adv. sheets, 1879, p. 34).

*Dicranograptus* (*Dicellograptus*) *divaricatus* Roemer and Frech, Leth. Pal., 1, 3 Lief, p. 618.

Chazy (Normanskill): Kenwood, Glenmont, Stockport, etc., New York; Nevada; Canada; Arkansas.

Middle Ordovician: Scotland and Wales (Glenkiln); New South Wales; Australia.

**Dicellograptus divaricatus bicurvatus** Ruedemann.

*Dicellograptus elegans* Gurley, Geol. Surv. Arkansas, Ann. Rep. for 1890, 3, 1892, p. 414; Jour. Geol., 4, 1896, pp. 71, 95.

*Dicellograptus divaricatus* var. *bicurvatus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 300, pl. 18, fig. 8, text fig. 216.

Chazy (Normanskill): Kenwood and Glenwood, New York; Ouachita Mountains, Oklahoma (Talihina); Arkansas (Stringtown).

Observation.—The species listed by Gurley as *D. elegans* Carruthers in all probability refers to this variety. See Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 312.

*DICELLOGRAPTUS DIVARICATUS* Lapworth (1876). See *Dicellograptus divaricatus rigidus*.

**Dicellograptus divaricatus rectus** Ruedemann.

*Dicellograptus divaricatus* var. *rectus* Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, p. 299, pl. 18, fig. 7, text fig. 215.

Chazy (Normanskill): Kenwood and Speigletown, New York.

**Dicellograptus divaricatus rigidus** Lapworth.

*Dicellograptus divaricatus* Lapworth, Cat. West. Scott. Foss., 1876, pl. 4, fig. 86.

*Dicellograptus moffatensis* var. *divaricatus* Lapworth, Belfast Nat. Field Club, Rep. and Proc., 1, pt. 4, app. 1877, p. 141, pl. 7, fig. 10.

*Dicellograptus rigidus* Gurley, Geol. Surv. Arkansas, 3d Ann. Rep., 1890, p. 416; Jour. Geol., 4, 1896, p. 297.

*Dicellograptus divaricatus* var. *rigidus* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 163, pl. 5, fig. 20.—Elles and Wood, Mon. British Grapt., 1904, p. 144, fig. 88a; pl. 20, figs. 6a–e.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 301.

Ordovician: Great Britain (Glenkiln); Arkansas and Oklahoma (Normanskill-Stringtown).

*Plesiotype*.—Cat. No. 54259, U.S.N.M.



**Dicellograptus divaricatus salopiensis** Elles and Wood.

*Dicellograptus divaricatus* var. *salopiensis* Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 145, pl. 20, figs. 7a-e.—Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, p. 300, pl. 18, fig. 5, text figs. 217-219.

Ordovician: Shropshire, England, and South Scotland (Glenkiln); Stockport and Kenwood, New York (Normanskill).

*DICELLOGRAPTUS ELEGANS* Gurley. See *Dicellograptus divaricatus bicurvatus*.

**Dicellograptus gurleyi** Lapworth.

*Dicellograptus gurleyi* (Lapworth MSS) Gurley, Jour. Geol., 4, 1896, p. 70.—Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, pp. 303-306, pl. 19, figs. 7-9, text figs. 223-228.

Chazyan (Normanskill): Stockport, Glenmont, and Mount Moreno, New York; Arkansas (Stringtown).

*Plesiotype*.—Cat. No. 54265, U.S.N.M.

**Dicellograptus intortus** Lapworth.

*Dicellograptus intortus* Lapworth, Ann. and Mag. Nat. Hist., 5th ser., 5, 1880, p. 161, pl. 5, fig. 19a.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 146, figs. 90a, b, pl. 20, figs. a-f.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 302, 303, figs. 221, 222; pl. 18, figs. 9-10.

*Dicellograptus intortus* Gurley, Jour. Geol., 4, 1896, p. 95.

*Dicellograptus intortus polythecatus* Gurley, Jour. Geol., 4, 1896, p. 70.

Ordovician: Great Britain (Glenkiln); Stockport and Speigletown, New York; Arkansas (Normanskill).

*DICELLOGRAPTUS INTORTUS POLYTHECATUS* Gurley. See *Dicellograptus intortus*.

**Dicellograptus mensurans** Ruedemann.

*Dicellograptus mensurans* Ruedemann, Mem. New York State Mus., 11, 1908, pt. 2, pp. 295, 296, pl. 18, fig. 2, text figs. 210, 211.

Chazyan: Kenwood, New York (Normanskill); Alabama (Athens).

**Dicellograptus moffatensis alabamensis** Ruedemann.

*Dicellograptus moffatensis* var. *alabamensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 310-312, pl. 20, figs. 1, 2, text figs. 234-236.

Chazyan (Athens): Near Pratt's Ferry, Bibb County, Alabama.

*DICELLOGRAPTUS MOFFATENSIS* var. *DIVARICATUS* Ami. See *Dicellograptus divaricatus*.

*DICELLOGRAPTUS MOFFATENSIS* var. *DIVARICATUS* Lapworth. See *Dicellograptus divaricatus rigidus*.

*DICELLOGRAPTUS RIGIDUS* Gurley. See *Dicellograptus divaricatus rigidus*.

**Dicellograptus sextans** (Hall).

*Graptolithus sextans* Hall, Pal. New York, 1, 1847, p. 273, pl. 74, fig. 3.—Salter, Quar. Jour. Geol. Soc., 5, 1849, p. 17, pl. 1, fig. 10.—Chapman, Canadian Jour., n. s., 1, 1856, p. 389, fig. 2.—Carruthers, Siluria, 4th ed., 1867, p. 61, fig. 8.—Hall, 20th Rep. New York State Cab. Hist., 1868, pp. 180, 227; rev. ed., 1870, pp. 212, 224.—Nicholson, Quar. Jour. Geol. Soc., 24, 1868, p. 134.

*Diplograptus?* *sextans* McCoy, British Pal. Foss., 1855, p. 9.

*Didymograptus sextans* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 5, 1870, p. 354, pl. 9, fig. 9.

**Dicellograptus sextans**—Continued.

*Dicellograptus sextans* Lapworth, Belfast Nat. Field Club, Rep. and Proc., 1, pt. 4, 1877, pl. 7, fig. 4.—Linnarsson, Sver. Geol. Unders., ser. C, no. 31, 1879, p. 18.—Lapworth, Ann. and Mag. Nat. Hist., 5th ser., 6, 1880, p. 19; Trans. Roy. Soc. Canada, 5, sec. 4, 1886, p. 178.—Ami, Canadian Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 117.—Walcott, Geol. Soc. Amer. Bull., 1, 1890, p. 339.—Gurley, Jour. Geol., 4, 1896, p. 297.—T. S. Hall, Roy. Soc. Victoria Proc., 9, 1896, p. 184; Geol. Mag., n. s., dec. 4, 6, 1899, p. 445.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 539.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 153, pl. 21, figs. 1a-e.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—Ami, Geol. Surv. Canada, Sum. Rep., 1905, p. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 33, fig. 53d, e.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 306-308, pl. 19, fig. 1, text figs. 229-230.

*Dicellograptus cf. sextans* Tullberg, Sver. Geol. Unders., ser. C, No. 50, 1882, p. 20. *Dicranograptus sextans* Hopkinson, Geol. Mag., 7, 1870, p. 356, pl. 16, fig. 1.—Lapworth, Cat. West. Scott. Foss., 1876, p. 6, pl. 3, fig. 78.—Walcott, Trans. Albany Inst., 10, 1883, p. 34 (adv. sheets, 1879).—Richardson, Terranes of Orange County, Vermont, 1902, p. 63.

*Dicranograptus (Dicellograptus) sextans* Roemer and Frech, Leth. Pal., 1, 1897, p. 621.

*Dicranograptus formosus* Hopkinson, Geol. Mag., 7, 1870, p. 356.

Middle Ordovician: Glenmont, Mt. Moreno, etc., New York; Vermont; Arkansas (Normanskill); England; Wales; Scotland; Ireland; Sweden; and Australia.

**Dicellograptus sextans exilis** Elles and Wood.

*Dicellograptus sextans* var. *exilis*, Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 153.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 309, 310, fig. 231.

*Graptolithus sextans* (pars.) Hall, Pal. New York, 1, 1847, pl. 74, fig. 3a.

Middle Ordovician: Great Britain (Glenkiln); Glenmont and Mt. Moreno, New York (Normanskill).

**Dicellograptus sextans perexilis** Ruedemann.

*Dicellograptus sextans* var. *perexilis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 310, pl. 19, fig. 2, text fig. 233.

Chazy (Normanskill): Mt. Moreno, near Hudson, New York.

**Dicellograptus sextans tortus** Ruedemann.

*Dicellograptus sextans* var. *tortus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 309, fig. 232.

Chazy (Normanskill): Kenwood, New York.

**Dicellograptus smithi** Ruedemann.

*Dicellograptus smithi* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 313-315, pl. 19, figs. 3-6, text figs. 237, 238.

Chazy (Athens): Near Pratt's Ferry, Bibb County, Alabama.

**DICELLOGRAPTUS TENUIS** Lapworth. See *Didymograptus subtennis*.

**DICELLOMUS** Hall.

Genotype: *Lingula polita* Hall.

*Dicellomus* Hall, 23d Ann. Rep. New York State Cab. Nat. Hist., 1873, p. 246.—Walcott, Mon. U. S. Geol. Surv., 1889, 32, pt. 2, p. 446; Proc. U. S. Nat. Mus., 28, 1905, pp. 312-313.—Grabau and Shimer, N. A. Index Fossils, 1907, 1, p. 189.—Walcott, Smiths. Misc. Coll., 53, 1908, pl. 11, pp. 142, 144; Mon. U. S. Geol. Surv., 51, 1912, p. 571.



**DICELLOMUS**—Continued.

*Schmidtia* Zittel (part) (not Volborth), *Handb. Pal.*, 1, 1880, p. 665.

*Obolella* Hall and Clarke (part), 11th Ann. Rep. State Geol. New York, 1892, pp. 240-241; 45th Ann. Rep. New York State Mus., 1892, pp. 556-557; *Pal. New York*, 8, pt. 1, 1892, pp. 66-73.

**Dicellomus nanus** (Meek and Hayden).

*Obolella nana* Meek and Hayden, *Proc. Acad. Nat. Sci. Philadelphia*, 13, 1862, p. 435; *Amer. Jour. Sci.*, 2d ser., 33, 1862, p. 73, figs. 1a, b, 2a, b.—Billings, *Geol. Surv. Canada, Pal. Foss.*, 1, 1862, pp. 67, 68.—Meek and Hayden, *Smiths. Cont. Knowl.*, 172, *Pal. Upper Missouri*, pt. 1, 1865, p. 4, pl. 1, figs. 3a-3d.—Whitfield, *U. S. Geogr. and Geol. Surv. Rocky Mountains Region*, *Rep. Geol. Res. Black Hills of Dakota*, by Newton and Jenney, 1880, pp. 340-341, pl. 2, figs. 14-17.—Walcott, *Bull. U. S. Geol. Surv.*, 30, 1886, p. 111.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 69, 70.

*Dicellomus nanus* Walcott (part), *Mon. U. S. Geol. Surv.*, 32, pt. 2, 1899, p. 447, pl. 60, figs. 3a-d (not fig. 3); *Proc. U. S. Nat. Mus.*, 28, 1905, pp. 314-315; *Mon. U. S. Geol. Surv.*, 51, 1912, p. 573, pl. 53, figs. 1, 1a-1, 2, 2a, 3, 3a-d.

Lower Ordovician: Near Buffalo Fork Peak, Uinta County, Wyoming. Also Upper and Middle Cambrian of Montana, Missouri, etc.

*Plesiotypes*.—Cat. No. 31903, 51908, U.S.N.M.

**DICHOGRAPSUS** Salter. See *Dichograptus* Salter.

**DICHOGRAPSUS ARANEA** Salter. See *Dichograptus octobrachiatus*.

**DICHOGRAPSUS FLEXILIS** Hall. See *Clonograptus flexilis*.

**DICHOGRAPSUS LOGANI** Nicholson. See *Loganograptus logani*.

**DICHOGRAPSUS MILESI** Hall. See *Clonograptus milesi*.

**DICHOGRAPSUS OCTOBRACHIATUS** Nicholson. See *Dichograptus octobrachiatus*.

**DICHOGRAPSUS OCTONARIUS** Hall. See *Dichograptus octonarius*.

**DICHOGRAPSUS RAMULUS** Gurley. See *Temnograptus? ramulus*.

**DICHOGRAPSUS REMOTUS** Gurley. See *Clonograptus remotus*.

**DICHOGRAPSUS RIGIDUS** Hall. See *Clonograptus rigidus*.

**DICHOGRAPTUS** Salter.

Genotype: *Dichograpsus aranea* Salter=*Graptolithus octobrachiatus* Hall.

*Dichograpsus* Salter, *Quart. Jour. Geol. Soc. London*, 19, 1863, p. 139.—Nicholson, *ibid.*, 24, 1868, p. 9, 127.—Carruthers, *Geol. Mag.*, 5, 1868, p. 73, 129.—Nicholson, *Mon. British Grapt.*, 1872, p. 106; *Ann. Mag. Nat. Hist.*, 4th ser., 11, 1873, p. 138.

*Dichograptus*, Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 217; rev. ed., 1870, p. 251.—Zittel, *Handb. Pal.*, 1, 1879, p. 299.—Tullberg, *Sver. Geol. Unders.*, ser. C, No. 55, 1883, p. 12.—Hermann, *Geol. Mag.*, dec. 3, 3, 1886, p. 21.—Barrois, *Ann. Soc. Geol. du Nord*, 21, Lille, p. 108.—Nicholson and Murie, *Geol. Mag.*, dec. 4, 2, p. 532, fig.—Wiman, *Bull. Geol. Inst. Univ. Upsala*, 2, pt. 2, 1896, p. 265.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 328.—Roemer and Frech, *Leth. geog.*, *Leth. Pal.*, 1897, p. 594.—Elles, *Quart. Jour. Geol. Soc. London*, 54, 1898, p. 483.—Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 118.—Elles and Wood, *Mon. British Grapt. Pal. Soc.*, 1902, p. 76.—Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, p. 634.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 28.—Ruedemann, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 129.



*DICHOGRAPTUS ABNORMIS* Hall. See *Clonograptus abnormis*.

*DICHOGRAPTUS DIVARICATUS* Whitfield. See *Dicellograptus divaricatus*.

*DICHOGRAPTUS FLABELLIFORMIS* Brögger. See *Dictyonema flabelliforme*.

*DICHOGRAPTUS FURCATUS* Whitfield. See *Dicranograptus furcatus*.

*DICHOGRAPTUS LOGANI* Nicholson. See *Loganograptus logani*.

***Dichograptus octobrachiatus* (Hall).**

*Graptolithus octobrachiatus* Hall, Geol. Surv. Canada, Rep. for 1857, 1858, p. 122; Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 96, pl. 7, figs. 1-7; pl. 8, figs. 1-4.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 226, fig. 232.

*Dichograptus aranea* Salter, Quart. Jour. Geol. Soc., 19, 1863, p. 137, figs. 9, 10.

*Graptolithus* (*Loganograptus*) *octobrachiatus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 174, fig. 5; pl. 3, figs. 23-27; rev. ed., 1870, p. 207, fig. 5, pl. 3, fig. 23-27.

*Graptolithes* (*Didymograptus*) *octobrachiatus* McCoy, Geol. Surv. Victoria, Prod. Pal. Victoria, dec. 1, 1874, p. 17, pl. 2, fig. 4.

*Dichograptus octobrachiatus* Nicholson, Quart. Jour. Geol. Soc., 24, 1868, p. 129, pl. 5, figs. 1, 2; Ann. Mag. Nat. Hist., 4th ser., 1, 1868, p. 56, pl. 3, fig. 6.

*Dichograptus octobrachiatus* Nicholson, Mon. British Grapt., 1872, p. 107, fig. 50.—Brögger, Die silurischen Etagen, 2, 3, 1882, p. 38.—Herrmann, Nyt. Mag. Naturv., 29, 1885, p. 124; Geol. Mag., dec. 3, 3, 1886, p. 22, fig. 7.—Lecrenier, Ann. Soc. Geol. Belg., 14, 1887, p. 182.—Ami, Geol. Surv. Canada Rep., 2d ser., 3, pt. 2, 1889, p. 117k.—Törnquist, Lunds Univ. Arsskrift., 26, 1891, p. 12, pl. 1, fig. 1.—Nicholson and Marr, Geol. Mag., dec. 4, 2, 1895, p. 534, fig.—Gurley, Jour. Geol., 4, 1896, p. 294.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 595.—Elles, Quart. Jour. Geol. Soc., 54, 1898, p. 483.—Ruedemann, New York State Pal., Ann. Rep. 1902, pp. 554, 556.—Elles and Wood, Mon. British Grapt., pt. 1, 1902, p. 77, pl. 9; pl. 10, figs. 1a-e.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 634-637, pl. 8, figs. 1-7; pl. 9, figs. 1-2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 28, fig. 41.

Canadian: Point Levis, Quebec (*Levis*, *Didymograptus* zone); Deepkill, Rensselaer County, New York (*Deepkill*, *Tetragraptus*, *Didymograptus*, and *Diplograptus* zones); England (*Skiddaw*); Wales (*Arenig*); Scandinavia; Belgium; Australia.

***Dichograptus octonarius* (Hall).**

*Graptolithus octonarius* Hall, Canadian Nat. Geol., 3, 1858, p. 148; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 124; Geol. Surv. Canada, dec. 2, 1865, p. 95, pl. 10, figs. 1, 2.

*Graptolithus* (*Monoprion*) *octonarius* Hall, 20th Rep. New York State Cab. Hist., 1868, p. 226, pl. 3, fig. 22; rev. ed., 1870, p. 260, pl. 3, fig. 22; p. 223.

*Dichograptus octonarius* Gurley, Jour. Geol., 4, 1896, p. 95 (gen. ref.)

*Dichograptus octonarius* Hall (T. S.), Geol. Mag., dec. 4, 6, 1899, p. 449, pl. 22, fig. 7.

Canadian: Point Levis, Quebec (*Levis*); Australia.

*DICHOGRAPTUS THUREAUI* Frech. See *Goniograptus thureaui*.

***Dichotrypa grandis* Ulrich.**

*Dichotrypa grandis* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 498, pl. 43, figs. 1-1e. Niagara (?): Will County, near Wilmington, Illinois (?).

Observation.—This form is probably from the St. Louis group of Illinois and may be the same as *Dichotrypa elegans* Ulrich.

**DICRANELLA** Ulrich.Genotype: *D. bicornis* Ulrich.

*Dicranella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 664; Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 349.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 738.

**Dicranella bicornis** Ulrich.

*Dicranella bicornis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 665, pl. 44, fig. 26; pl. 46, figs. 39, 40.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 349, fig. 1657, j, k.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425d. *Beyrichia bicornis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.). Black River (Decorah): Minneapolis and St. Paul, Minnesota. *Cotypes*.—Cat. No. 41366, U.S.N.M.

**Dicranella? byrnesi** (Miller).

*Leperditia Byrnesi* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 123, fig. 10; N. A. Geol. Pal., 1889, p. 552, fig. 1020. *Æchmina Byrnesi* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 12, pl. 3, figs. 9-11. *Dicranella? byrnesi* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 664. Eden (Fulton): Cincinnati, Ohio, and vicinity.

**Dicranella marginata** Ulrich.

*Dicranella marginata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 666, pl. 44, figs. 27, 28. *Beyrichia marginata* Miller, N. A. Geol. Pal., 2d App., 1897, p. 786 (gen. ref.). Black River (Decorah): Fountain, Minnesota. *Holotype*.—Cat. No. 41368, U.S.N.M.

**Dicranella? simplex** Ulrich.

*Dicranella? simplex* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 666, pl. 44, figs. 24, 25; pl. 46, fig. 42. *Beyrichia simplex* Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.). Black River (Decorah): Fountain, Minnesota. *Holotype*.—Cat. No. 41367, U.S.N.M.

**Dicranella spinosa** Ulrich.

*Dicranella spinosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 665, pl. 44, fig. 23; pl. 46, fig. 41. *Beyrichia spinosa* Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.). Black River (Decorah): Minneapolis, Minnesota. *Holotype*.—Cat. No. 41369, U.S.N.M.

**DICRANISCUS** Meek. See *Triplecia* Hall.

**DICRANOGRAPTUS** Hall.Genotype: *Graptolithus ramosus* Hall.

*Dicranograptus* Hall, Can. Org. Remains, dec. 2, 1865, p. 112; 20th Rep. New York State Cab. Hist., 1868, p. 218; rev. ed., 1870, p. 252.—Carruthers, Geol. Mag., 5, 1868, p. 73, 132.—Hopkinson, Geol. Mag., 7, 1870, p. 353.—Richter, Zeits. d. d. geol. Gesell., 27, 1875, p. 266.—Zittel, Handb. Pal., 1, 1879, p. 300.—Tullberg, Sveriges Geol. Unders., ser. C, No. 55, 1883, pp. 12, 14.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 562.—Miller, N. A. Geol. Pal., 1889, p. 185.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 160.—Gurley, Jour. Geol., 4, 1896, p. 71.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, 1896, p. 264.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Roemer and Frech, Leth. geog., Leth. Pal., 1897, p. 615.; Zittel-Eastman



**DICRANOGRAPTUS**—Continued.

Textb. Pal., 1, 1900, p. 119.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 315–317; Zittel-Eastman Pal., 2d ed., 1913, p. 130.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32.

Dicranograptus Nicholson, Ann. Mag. Nat. Hist., 4th ser., 6, 1870, p. 371; Mon. British Grapt., 1872, p. 118.

DICRANOGRAPTUS ARKANSASSENSIS Gurley. See *Dicranograptus ramosus arkansasensis*.

DICRANOGRAPTUS ARUNDINACEUS Hall. See *Mastigograptus arundinaceus*.

**Dicranograptus contortus** Ruedemann.

*Dicranograptus contortus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 337–338, pl. 23, fig. 9; figs. 275–278.

Chazy (Normanskill): Kenwood and Troy, New York.

DICRANOGRAPTUS DISSIMILARIS Emmons. See *Diplograptus foliaceus*.

DICRANOGRAPTUS DIVARICATUS Walcott. See *Dicellograptus divaricatus*.

DICRANOGRAPTUS FORMOSUS Hopkinson. See *Dicellograptus sextans*.

**Dicranograptus furcatus** (Hall).

*Graptolithus furcatus* Hall, Pal. New York, 1, 1847, p. 237, pl. 74, figs. 4a–h.—Chapman, Can. Jour., 1, 1856, p. 390, fig. 10.

*Dicranograptus furcatus* Hall, Geol. Surv. Canada Can. Org. Rem., dec. 2, 1865, p. 15.—Lapworth, Ann. Mag. Nat. Hist., 5, 1880, p. 283.—Walcott, Alb. Inst. Trans., 10, 1883 (Adv. sheet, 1879), p. 34.—Whitfield, Am. Jour. Sci., 3d ser., 26, 1883, p. 380.—Walcott, Geol. Soc. Bull., 1, 1890, p. 339.—Gurley, Jour. Geol., 4, 1896, p. 297.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 334–336, pl. 23, fig. 7; text fig. 272.

*Dicranograptus nicholsoni* Frech, Leth. Pal., 1, 1897, p. 617, fig. 181.

Chazy (Normanskill): Glenmont, etc., New York; Silver Peak Quadrangle, Nevada.

*Plesiotypes*.—Cat. No. 54251, U.S.N.M.

**Dicranograptus furcatus exilis** Ruedemann.

*Dicranograptus furcatus* var. *exilis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 337, pl. 23, fig. 8; figs. 273–274.

Chazy (Normanskill): Kenwood, New York.

DICRANOGRAPTUS INÆQUALIS (Emmons). See *Cladograptus inæqualis*.

**Dicranograptus nicholsoni** Hopkinson.

*Dicranograptus nicholsoni* Hopkinson, Geol. Mag., 7, 1870, p. 357, pl. 16, fig. 3.—Lapworth, Cat. West. Scott. Foss., 1876, p. 6, pl. 3, fig. 79; Belfast Nat. Field Club, Rep. and Proc., App., 1, pt. 4, 1877, p. 141, pl. 7, fig. 2.—Tullberg, Sver. Geol. Unders., ser. C, No. 50, 1882, p. 20.—Gurley, Jour. Geol., 4, 1896, p. 297.—Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 171, pl. 25, figs. 1a–h.—T. S. Hall, Proc. Roy. Soc. Victoria, 18, 1905, p. 24, pl. 6, fig. 7; Rec. Geol. Surv. Victoria, 1, pt. 4, 1906, p. 274.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 317–320, pl. 20, figs. 3, 5; pl. 21, fig. 1; figs. 241, 242.

Middle Ordovician: Great Britain (Glenkiln and Hartfell); Scania; Victoria; Saratoga County, etc., New York (Trenton-Utica); Ohio (Fulton).

*Plesiotypes*.—Cat. Nos. 54247, 54269, U.S.N.M.



**DICRANOGRAPTUS NICHOLSONI** Frech. See *Dicranograptus furcatus*.

**DICRANOGRAPTUS NICHOLSONI ARKANSASENSIS** Gurley. See *Dicranograptus ramosus arkansasensis*.

***Dicranograptus nicholsoni diapason* Gurley.**

*Dicranograptus nicholsoni* var. *diapason* Gurley, Jour. Geol., 4, 1896, p. 73.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 322–324, pl. 21, figs. 3–5, figs. 249–254.

Chazy (Normanskill): Glenmont, Stockport, etc., New York; Arkansas.

*Cotype*.—Cat. No. 54286, U.S.N.M.

***Dicranograptus nicholsoni parvangelus* Gurley.**

*Dicranograptus nicholsoni* var. *parvangelus* Gurley, Ann. Rep. Geol. Surv. Arkansas, 3, 1892, p. 417; Jour. Geol., 4, 1896, p. 73.—Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, pp. 320–322, pl. 21, fig. 2, figs. 243–248.

Chazy (Normanskill): Mount Moreno, Glenmont, Stockport, etc., New York; Arkansas.

*Cotypes*.—Cat. Nos. 54257, 54258, U.S.N.M.

***Dicranograptus nicholsoni parvulus* Ruedemann.**

*Dicranograptus nicholsoni* var. *parvulus* Ruedemann, Bull. New York State Mus., 162, 1912, p. 78, figs. 17, 18.

Trenton (Canajoharie): Near Pattersonville, New York.

***Dicranograptus nicholsoni whitianus* (Miller).**

*Graptolithus* (*Climacograptus*) *ramulus* White (preoccupied), Wheeler's Expl. Surv. West 100th Merid., 4, pt. 1, 1877, p. 62, pl. 4, figs. 3a–c.

*Graptolithus whitianus* Miller, Amer. Pal. Foss., 2d ed., 1883, p. 269.

*Dicranograptus nicholsoni* var. *whitianus* Gurley, Jour. Geol., 4, 1896, p. 72, 300.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 324.

Chazy (Normanskill zone): Five miles north of Summit, Nevada.

*Holotype*.—Cat. No. 8555, U.S.N.M.

**DICRANOGRAPTUS RAMOSUS** Hopkinson. See *Dicranograptus spinifer*.

***Dicranograptus ramosus* (Hall).**

*Graptolithus ramosus* Hall, Pal. New York, 1, 1847, p. 270, pl. 73, fig. 3a–h.—Salter, Geol. Soc. Quar. Jour., 5, 1848, p. 16, pl. 1, fig. 7; Geol. Surv. Canada, dec., 1865, p. 15, fig. 20.—Chapman, Canadian Jour., 8, 1863, p. 205, text fig. 203.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 200, fig. 194.

*Graptolithus* (*Dicranograptus*) *ramosus* Hall, New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, p. 181, fig. 21; pl. 2, figs. 18–21, p. 227; rev. ed., 1870, p. 212.

*Cladograpsus ramosus* Geinitz, Die Graptolithen, 1852, p. 29.—McCoy, Geol. Surv. Victoria, dec. 2, 1875, pl. 20, fig. 2.

*Cladograpsus* sp. undet. Emmons, Amer. Geology, 1856, pl. 1, fig. 12.

*Dicranograptus ramosus* Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 330, pl. 11A, fig. 1; Siluria, 4th ed., 1866, p. 541, fig. 4.—Nicholson, Mon. British Grapt., 1872, p. 119, fig. 60.—Lapworth, Cat. West. Scot. Foss., 1876, p. 6, pl. 4, fig. 80.—Whitfield, U. S. Geog. Surv. West 100th Merid., Wheeler's Rep., 1877.—Walcott, Alb. Inst. Trans., 10, 1883 (Advance sheet, 1879, p. 34).—Lapworth, Roy. Soc. Canada Trans., 5, sec. 4, 1886, p. 184.—Ami, Canadian Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 117K.—Miller, N. A. Geol. Pal., 1889, p. 185, fig. 167.—Walcott, Bull. Geol. Soc., 1, 1890, 339.—Gurley, Geol. Surv. Arkansas Ann. Rep., 3, 1892, p. 411.—James, Jour. Cincinnati

**Dicranograptus ramosus**—Continued.

Soc. Nat. Hist., 14, 1892, p. 160.—Gurley, Jour. Geol., 4, 1896, p. 297.—T. S. Hall, Proc. Roy. Soc. Victoria, 9, 1896, pl. 1, p. 184.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, 616, fig. 180.—T. S. Hall, Geol. Mag., n. s., dec. 4, 6, 1899, 445.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 496ff.—T. S. Hall, Geol. Surv. Victoria Rec., 1, pt. 1, 1902, p. 33.—Clark, Geol. Mag. (4), 9, 1902, p. 498.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 55, 213, pl. 16, figs. 10, 11.—Elles and Wood, Mon. British Grapt., 1904, p. 175, pl. 24, figs. 6a, b.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32, fig. 52.—Ruedemann, Mem. New York State Mus., 11, pt. 2, pp. 325–328, pl. 23, fig. 1, text figs. 255, 256, 411.

Middle Ordovician: Mount Moreno, Kenwood, Stockport, etc., New York; Canada; New Jersey; Arkansas; Oklahoma (Normanskill); Victoria and Australia. Hartfell and Glenkiln shales of Great Britain.

**Dicranograptus ramosus arkansasensis** (Gurley).

Dicranograptus arkansasensis Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, 1892, p. 416, pl. 9, figs. 1, 2.

Dicranograptus nicholsoni arkansasensis Gurley, Jour. Geol., 4, 1896, p. 72.

Dicranograptus ramosus var. arkansasensis Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 329, figs. 257, 258.

Middle Ordovician: Arkansas (Normanskill); Great Britain (Glenkiln).

*Cotype*.—Cat. No. 54261, U.S.N.M.

**DICRANOGRAPTUS RAMOSUS** var. **SPINIFER** Elles and Wood. See *Dicranograptus spinifer*.

**DICRANOGRAPTUS RAMULUS** Herrman. See *Dicranograptus nicholsoni whitianus*.

**Dicranograptus rectus** Hopkinson.

Graptolithus ramosus Salter, Quart. Jour. Geol. Soc. London, 5, 1849, p. 16, pl. 1, fig. 7.

Dicranograptus rectus Hopkinson, Geol. Mag., 9, 1872, p. 508, pl. 12, fig. 10.—Elles and Wood, Mon. British Grapt., 4, 1904, p. 169, pl. 24, figs. 4a–c.

Ordovician: South Scotland (Glenkiln); Arkansas (Normanskill–Stringtown).

**DICRANOGRAPTUS SEXTANS** Hopkinson. See *Dicellograptus sextans*.

**Dicranograptus spinifer** (Lapworth) Elles and Wood.

Dicranograptus ramosus Hopkinson, Geol. Mag., 7, 1870, p. 358, pl. 16, fig. 5.—Lapworth, Belfast Nat. Field Club, Rep. and Proc., App., 1, pt. 4, 1877, p. 140, pl. 7, fig. 1.

Dicranograptus ramosus var. spinifer (Lapworth MS.) Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 176, pl. 24, figs. 8a–c.

Dicranograptus spinifer Lapworth, Geol. Soc. Quart. Jour. London, 38, 1882, p. 610.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 330–332, pl. 22; pl. 23, figs. 2, 3, figs. 259–263.

Middle Ordovician: Great Britain (Hartfell and Glenkiln); Glenmont, Stockport, and Mount Moreno, New York (Normanskill).

**Dicranograptus spinifer geniculatus** Ruedemann.

Dicranograptus spinifer var. geniculatus Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, pp. 333, 334, pl. 23, figs. 4–6, text figs. 265–267.

Chazyan (Normanskill): Glenmont, and Mount Moreno, New York.



**DICRANOPELTIS** Hawle and Corda.Genotype: *Lichas scabra* Beyrich.

*Dicranopeltis* Hawle and Corda, Abh. d. k. böhmischen Gesell. Wiss., 5, 1847 (extract), p. 141, pl. 7, fig. 75.—Gurich, Neues Jahrb. Min., Geol. Pal., 14, Beilage-Band, 1901, p. 525.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 63, 61; sec. B, pp. 71, 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 310.

**Dicranopeltis arkansana** (Van Ingen).

*Arges arkansana* Van Ingen, School of Mines Quart., 23, 1901, p. 61, fig. 19, pl. figs. 19–21.

Niagaran (St. Clair): St. Clair Springs, Independence County, Arkansas.

**Dicranopeltis decipiens** (Winchell and Marcy).

*Lichas breviceps*? Hall, Adv. sheets., 18th Rep. New York State Cab. Nat. Hist., 1865, p. 30 (not Hall, 1864); 20th Rep. New York State Cab. Nat. Hist., 1867, p. 334, p. 377, pl. 21, figs. 12–14; rev. ed., 1870, p. 424, pl. 21, figs. 12–14.

*Lichas decipiens* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 104, pl. 3, fig. 11.

*Lichas emarginatus* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 199.

*Dicranopeltis decipiens* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 237, pl. 22, figs. 10, 11.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 311, fig. 1621f, g.

Niagaran (Racine): Bridgeport, Hawthorn, and Lemont, Illinois; Grafton, Wisconsin.

**Dicranopeltis nasuta** Weller.

*Dicranopeltis nasuta* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 240, pl. 22, figs. 5–7.

Niagaran (Racine): Milwaukee, Wisconsin.

**Dicranopeltis telleri** Weller.

*Dicranopeltis telleri* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 241, pl. 22, figs. 8–9.

Niagaran (Racine): Milwaukee, Wisconsin.

**DICRANOPORA** Ulrich.Genotype: *Ptilodictya internodia* Miller and Dyer.

*Dicranopora* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 152, 166.—Miller, N. A. Geol. Pal., 1889, p. 300.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 389.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, p. 14.—Simpson, 14th Ann. Rep. State Geol. New York for the year 1894, 1897, p. 545.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 49.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 745.

**Dicranopora emacerata** (Nicholson).

*Ptilodictya emacerata* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 15, 1875, p. 179, pl. 14, figs. 3–3b; Pal. Ohio, 2, 1875, p. 261, pl. 25, figs. 5–5b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 826, figs.

*Dicranopora emacerata* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 40.—Whiteaves, Pal. Foss., 3, 1895, p. 118.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 827, pl. 32, figs. 13, 13b.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Stony Mountain, Manitoba; Anticosti.

**Dicranopora fragilis** (Billings).

*Ptilodictya fragilis* Billings, Catal. Sil. Foss. Anticosti, 1866, p. 9.

*Stictopora fragilis* Whitfield, Geol. Surv. Wisconsin, 4, 1882, p. 253, pl. 11, fig. 24.



**Dicranopora fragilis**—Continued.

*Dicranopora fragilis* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 40.—Whiteaves, Pal. Foss., 3, 1895, p. 118.

Richmond: Charleton Point, Anticosti (Charleton); Iron Ridge, Wisconsin (Maquoketa); Stony Mountain, Manitoba (Stony Mountain).

**Dicranopora internodia** (Miller and Dyer).

*Ptilodictya internodia* Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 7, pl. 4, figs. 7, 7a.

*Dicranopora internodia* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 166, pl. 7, figs. 9, 9a.—Miller, N. A. Geol. Pal., 1889, fig. 471 (p. 300).

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

**DICRANOPORA LATA** Ulrich. See *Rhinidictya lata*.

**Dicranopora meeki** (James).

*Helopora meeki* James, Paleontologist, No. 1, 1878, p. 3.

*Dicranopora meeki* Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 36, pl. 5, fig. 1.

Maysville (Mount Hope): Cincinnati, Ohio, and vicinity.

**DICRANOPORA NITIDULA** Miller. See *Rhinidictya nitidula*.

**Dicranopora parva** Ami.

Not recognizable.

*Dicranopora parva* Ami, Canadian Rec. Sci., 5, 1892, p. 99.

Trenton: Gagnon's Beach, Quebec.

**DICRANOPORA TRENTONENSIS** Ulrich. See *Rhinidictya trentonensis*.

**DICTUOCRINITES** Conrad. See *Receptaculites Defrance*.

**DICTUOLITES BECKII** Hall. See *Lithodictyon becki*.

**DICTYOCEPHALITES** Bergeron. See *Harpides Beyrich*.

**DICTYOCRINUS** Hall. See *Ischadites Murchison*.

**DICTYOCRINUS** Conrad. See *Receptaculites Defrance*.

**DICTYOGRAPTUS** Moberg. See *Dictyonema Hall*.

**DICTYOGRAPTUS (DESMOGRAPTUS) CANCELLATUS** Hopkinson. See *Desmograptus cancellatus*.

**DICTYOGRAPTUS RETICULATUS** Ulrich. See *Dictyonema arbusculum*.

**DICTYONELLA** Hall.

Genotype: *Rhynchonella? reticulata* Hall.

*Dictyonella* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 274.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, pp. 81, 99; Zittel-Eastman Textb. Pal., 1, 1896, p. 312; 2d ed., 1913, p. 396.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 179; Bull. New York State Mus., 45, 1901, p. 179.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 209.

*Eichwaldia* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, pp. 274–277, with figs.—Dall, Amer. Jour. Conch., 6, 1870, p. 98.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 307; 13th Ann. Rep. New York State Geol., 1895, p. 903.

**Dictyonella anticostiensis** (Billings).

*Eichwaldia anticostiensis* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 10.

*Dictyonella anticostiensis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.

Richmond (Charleton): Near West End Lighthouse, Anticosti.

**Dictyonella concinna** (Hall).

Eichwaldia concinna Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 278.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 83, fig. 5.

Dictyonella concinna Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.—Foerste, Jour. Geol., 11, 1903, p. 709 (loc. occ.).

Niagaran (Brownsport): Perry and Decatur Counties, Tennessee.

**Dictyonella corallifera** (Hall).

Atrypa corallifera Hall, Pal. New York, 2, 1852, p. 281, pl. 58, fig. 5.

Eichwaldia corallifera Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 278.

Dictyonella corallifera Schuchert, Bull. U. S. Geol., 87, 1897, p. 211.—Grabau, Bull. New York State Mus., 45, 1901, p. 179, fig. 83; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 179, fig. 83.

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario.

**Dictyonella gibbosa** (Hall).

Eichwaldia gibbosa Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 278.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 83, figs. 6, 7.

Dictyonella gibbosa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.—Foerste, Jour. Geol., 11, 1903, p. 709.

Niagaran (Brownsport): Perry and Decatur Counties, Tennessee.

**Dictyonella reticulata** (Hall).

Rhynchonella? reticulata Hall, Trans. Albany Inst., 4, 1863, p. 217.

Eichwaldia reticulata Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, pp. 275–277, figs. 1–7; 28th Rep., ibid., 1879, p. 169, pl. 26, figs. 50–54; 11th Rep. State Geol. Indiana, 1882, p. 312, pl. 26, figs. 50–54.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 91, pl. 13, fig. 4.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 31, pl. 3, figs. 11–13.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 308, figs. 229–235; pl. 83, figs. 8–13.—Foerste, Geol. Ohio, 7, 1895, p. 594, pl. 25, fig. 4.

Dictyonella reticulata Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 210, fig. 247.

Silurian: Waldron, Indiana, and Newsom, Tennessee (Waldron); Dayton, Ohio (Brassfield); Wisconsin.

**DICTYONEMA** Hall.

Genotype: Gorgonia? retiformis Hall;

Dictyonema Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, p. 401; Pal. New York, 2, p. 174.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 171.—Hall, Canadian Nat. Geol., 3, 1858, p. 174; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 142; Pal. New York, 3, p. 15; Geol. Surv. Canada, dec. 2, 1865, p. 136; 20th Rep. New York State Cab. Hist., 1868, p. 218, rev. ed., p. 252.—Nicholson, Mon. British Grapt., 1872, p. 129.—Dames, Zeits. d. d. geol. Gesell., 25, 1873, p. 383.—Zittel, Handb. Pal., 1, 1879, p. 289.—Salter, Mem. Geol. Surv. Great Britain, 3, 1881, p. 331; 2d ed., p. 535.—Spencer, Bull. Mus. State Missouri, 1, 1884, p. 22; Trans. Acad. St. Louis, 4, 1884, pp. 262, 572.—Miller, N. A. Geol. Pal. 1889, p. 185.—Holm, Bihang till K. Sv. Vet.-Akad. Handl., 16, Afd. 4, No. 7, 1890, p. 4.—Moberg, Geol. Foren. Stockholm Forhandl., 13, 1891, p. 216; ibid., 16, 1894, p. 236.—Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 33.—James, Jour. Cincinnati Soc. Nat. Hist., 16, 1892, p. 153.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 190.—Moberg, Geol. Foren. Stockholm Forhandl., 16, 1894, p. 236.—Tornquist, Geol. Foren. Stockholm Forhandl., 16, 1894, p. 380.—Gurley, Jour. Geol., 4, 1896, p. 81.—Koken, Die Leitfossilien, Leipzig, 1896, p. 327, fig. 239.—Wiman, Nat. Sci., 9, 1896, p. 243.—Frech, Leth. Geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 557.—Grabau, Bull.



**DICTYONEMA**—Continued.

Buffalo Soc. Nat. Sci., 6, 1899, p. 119; *ibid.*, 7, 1901, p. 133; Bull. New York State Mus., 45, 1901, p. 133.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 591, 592.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 24.—Ruedemann, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 128.

*Dictyograptus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 667.—Moberg, Geol. Foren. Stockholm Forhandl., 16, 1894, p. 236.—Törnquist, *ibid.*, 16, 1894, p. 380.

**Dictyonema arbusculum** (Ulrich).

*Dictyonema irregularis* James (not Hall), Paleontologist, 3, 1879, p. 22.

*Dictyograptus reticulatus* Ulrich, Cat. Foss. Cincinnati group, 1880, p. 61 (nom. nud.).

*Inocaulis arbuscula* Ulrich, Cincinnati Soc. Nat. Hist. Jour., 2, 1879, p. 28, pl. 7, figs. 27, 27a.—Gurley, Jour. Geol., 4, 1896, p. 300.

*Calyptragraptus?* *arbusculus* Spencer, Acad. Sci. St. Louis Trans., 4, 1884, p. 563, footnote (gen. ref.).

*Dictyonema arbusculum* Gurley, in J. F. James, Cincinnati Soc. Nat. Hist. Jour., 1892, p. 153, 16, pt. 2.—Nickles, *ibid.*, 20, 1902, p. 72.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 151–153, figs. 57, 58; Bull. New York State Mus., 162, 1912, p. 77, pl. 2, fig. 15.

Eden: Covington, Kentucky, and vicinity (Southgate); Indian Ladder, New York (Indian Ladder).

*Holotype* and *plesiotype*.—Cat. Nos. 54288, 54289, U.S.N.M.

**Dictyonema areyi** Gurley.

*Dictyonema areyi* (Gurley MS.) Ruedemann, Mem. New York State Mus., 11, 1908, p. 164, pl. 4, fig. 2; text fig. 73.

Clinton (Rochester): Rochester, New York.

**Dictyonema canadense** (Whiteaves).

*Inocaulis Canadensis* Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, p. 149, pl. 17, fig. 4.

*Dictyonema canadensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 131 (gen. ref.).

Black River or Richmond: Inmost Island, Lake Winnipeg, Canada.

**DICTYONEMA (DESMOGRAPTUS) CANCELLATUM** Ruedemann. See *Desmograptus cancellatus*.

**Dictyonema crassibasale** Gurley.

*Dictyonema gracilis* Spencer (not Hall), Canadian Nat., 8, 1878, p. 458; *ibid.*, 10, 1882, p. 165; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 573, 574, pl. 2, figs. 2, 3; Bull. Mus. Univ. State Missouri, 1, 1884, p. 24, pl. 2, figs. 2, 2a, 3.

*Dictyonema crassibasale* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 19–24, pl. 3, fig. 1; text figs. 21–25.

Niagaran dolomite; Hamilton, Ontario.

**DICTYONEMA DELICATULUM** Dawson. See *Dictyonema perexile*.

**Dictyonema desmoldes** Gurley.

*Dictyonema desmoides* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 34, 35, pl. 4, fig. 3; text figs. 41–43.

Niagaran dolomite: Hamilton, Ontario.



**Dictyonema expansum** Spencer.

*Dictyonema expansum* Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pp. 464, 575, 576, pl. 2, fig. 1; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 25, 26, pl. 2, fig. 1.—Gurley, Jour. Geol., 4, 1896, pp. 96, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 31–33, figs. 36, 37.

Niagaran dolomite: Hamilton, Ontario.

**Dictyonema filiramus** Gurley.

*Dictyonema filiramus* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 34, figs. 38–40.

Niagaran dolomite: Hamilton, Ontario.

**Dictyonema flabelliforme** (Eichwald).

*Gorgonia flabelliformis* Eichwald, Sil. Schicht. in Estland, 1840, p. 207; Urwelt Russl., 1842, p. 45, tab. 1, fig. 6.

*Fenestella flabelliformis* Eichwald, Soc. Natur. Moscou, No. 1, 1854, p. 6; *ibid.*, 1855, No. 4, p. 453.

*Rhabdinopora flabelliformis* Eichwald, Leth. Ross., 1860, p. 369.

*Dictyograptus flabelliformis* Brögger, Die sil. Etagen 2 and 3, etc., 1882, p. 30, pl. 12, figs. 17–19.

*Dictyonema flabelliformis* Roemer, Zeits. d. d. geol. Gesell., 11, 1859, p. 553.—Tornquist, Lunds Univ. Arskrift, 2, 3, 1865, p. 22, pl. 1, fig. 14.—Tullberg, Bih. till K. Svenska Vet.-Akad. Handl., 6, No. 13, 1882.—Schmidt, Quart. Jour. Geol. Soc., 1862, p. 517.—Dawson, Rep., Peter Ridpath Mus., McGill, Univ., 1883, p. 16.—Moberg, Sver. Geol. Und. Afh. och. upps., ser. c, No. 109, 1890, p. 31.—Matthew, Trans. Roy. Soc. Canada, 9, 1892, p. 34, pl. 12, figs. 1–3b; Trans. Roy. Soc. Canada, 10, 1893, sec. 4, p. 10, footnote.—Wiman, Bull. Geol. Inst. Upsala, 2, pt. 2, 1895, p. 55, pl. 10, figs. 13, 14.—Matthew, Trans. New York Acad. Sci., 14, 1895, p. 262, 272, pl. 49, figs. 1, 2.—Wiman, Nat. Sci., 9, 1896, p. 245.—Roemer and Frech, Leth. Geog., 1 Theil, Pal. 1., 1897, p. 572, pl. 2, figs. 3a, b.—Dale, U. S. Geol. Surv., 19th Ann. Rep., pt. 3, 1899, p. 185.—Ruedemann, New York State Mus., 1903, p. 936; Mem. New York State Mus., 7, pt. 1, 1904, pp. 599–606, pl. 1, figs. 1–22, text figs. 26, 27.—Moberg, Lunds Univ., Arskrift, N. F. Afdeln., 2, vol. 2, No. 7, pl. 1, fig. 6, 1906.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 24, fig. 32.—Westergaard, Lunds Univ. Arskrift, N. F., Afdeln., 2, vol. 5, No. 3, 1909, pl. 3, figs. 3–5.

*Graptopora socialis* Salter, Amer. Assoc. Proc., 11, 1857, p. 65.

*Dictyonema sociale* Salter, Mem. Geol. Surv., 3, 1866, p. 331, pl. 4, fig. 1.—Lapworth, Trans. Roy. Soc. Canada, 4, 1887, p. 168, sec. 4.

*Dictyonema graptolithinum* Kjerulf, Veiviser Christiania, 1865, pp. 1, 3, figs. 4, 5.

*Bryograptus? multiramosus* Gurley, Jour. Geol., 4, 1896, p. 64.

*Dictyonema norvegicum* Kjerulf, Veiviser Christiania, 1865, pp. 1, 2, figs. 1–3.

*Dictyonema flabelliforme* var. *Norvegicum*, Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 37.—Hahn, Ann. New York Acad. Sci., 22, 1912, p. 139.

*Dictyonema flabelliforme* var. *Acadicum* Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 36.—Hahn, Ann. New York Acad. Sci., 22, 1912, p. 137.

*Dictyonema flabelliforme* var. *confertum* Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 36.—Hahn, Ann. New York Acad. Sci., 22, 1912, p. 138.

*Dictyonema flabelliforme ruedemanni* Hahn, Ann. New York Acad. Sci., 22, 1912, p. 139.

*Dictyonema flabelliforme desmograptus* Hahn, Ann. New York Acad. Sci., 22, 1912, p. 139.

**Dictyonema flabelliforme**—Continued.

Canadian (*Dictyonema flabelliforme* bed): Esthonia, Russia, Sweden, Wales, Belgium, etc.; slate belt of Rensselaer and Washington Counties, New York; Vermont; St. John Basin, New Brunswick.

**DICTYONEMA FLABELLIFORME** var. **ACADICUM** Matthew. See *Dictyonema flabelliforme*.

**DICTYONEMA FLABELLIFORME** var. **CONFERTUM** Matthew. See *Dictyonema flabelliforme*.

**DICTYONEMA FLABELLIFORME** **DESMOGRAPTUS** Hahn. See *Dictyonema flabelliforme*.

**DICTYONEMA FLABELLIFORME** **NORVEGICA** Hahn. See *Dictyonema flabelliforme*.

**DICTYONEMA FLABELLIFORME** **RUEDEMANNI** Hahn. See *Dictyonema flabelliforme*.

**Dictyonema furciferum** Ruedemann.

*Dictyonema* n. sp. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 570.

*Dictyonema furciferum* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 606, 607, pl. 3, fig. 11, text fig. 28.

*Callograptus grabau* Hahn, Annals New York Acad. Sci., 22, 1912, p. 142, figs.

Canadian: Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* and *D. bifidus* zones); Bellefonte, Pennsylvania (base of Stonehenge); Point Levis, Quebec (*Levis Diplograptus dentatus* zone).

**Dictyonema gracile** Hall.

*Gorgonia*? Hall, Geol. New York, 4th Dist., 1843, p. 115, fig. 42.

*Dictyonema gracilis* Hall, Pal. New York, 2, 1852, p. 175, pl. 40G, fig. 1a-d.—

Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, fig. 2.—

Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 225.—Rominger,

Geol. Surv. Michigan, 1, pt. 3, 1873, p. 44.—Lesquereux, Geol. Surv. Indiana,

13th Rep., 1883, p. 30.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, p. 193.—

Gurley, Jour. Geol., 4, 1896, p. 308.—Grabau and Shimer, N. A. Index Fossils,

1, 1906, p. 25, fig. 34.—Ruedemann, Mem. New York State Mus., 11, pt. 2,

1908, p. 157, pl. 1, fig. 5, text figs. 65-68.

Clinton (Rochester): Lockport, etc., New York; Ontario.

**DICTYONEMA GRACILIS** Spencer. See *Dictyonema crassibasale*.

**Dictyonema grande** Nicholson.

*Dictyonema grandis* Nicholson, Ann. Mag. Nat. Hist., 4th Ser., 11, 1873, p. 134, fig. 1.

Canadian (Levis): Point Levis, Quebec.

**DICTYONEMA GRAPTOLITHINUM** Kjerulf. See *Dictyonema flabelliforme*.

**DICTYONEMA HISINGERI** Göppert. See *Dictyonema flabelliforme*.

**Dictyonema irregulare** Hall.

*Dictyonema irregularis* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 136, pl. 20, figs. 1, 2.—Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 225, pl. 2, figs. 3-5.

Canadian: Point Levis, Quebec (*Levis, Diplograptus dentatus* zone); Bolivia.

**DICTYONEMA IRREGULARIS** James. See *Dictyonema arbusculum*.

**Dictyonema multiramosum** Ruedemann.

*Dictyonema multiramosum* Ruedemann, Bull. New York State Mus., 162, 1912, p. 78, pl. 2, fig. 16.

Trenton (Schenectady): Rotterdam Junction, New York.



**Dictyonema murrayi** Hall.

*Dictyonema murrayi* Hall, Canadian Org. Rem., Geol., Surv. Canada, dec. 2, 1865, p. 138, pl. 20, figs. 6, 7.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 606, pl. 3, fig. 12.

Canadian: Point Levis, Quebec (Levis, Clonograptus zone), Rensselaer County, New York (Deepkill).

*Plesiotype*.—Cat. No. 54287, U.S.N.M.

**Dictyonema murrayi tarijense** Hoek.

*Dictyonema murrayi* var. *tarijense* Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 224, pl. 12, figs. 1, 2.

Lowest Ordovician: Tarija, Bolivia.

**Dictyonema neenah** Hall.

*Dictyonema neenah* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 7; 20th Rep. New York State Cab. Nat. Hist., 1878, p. 225.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, p. 193.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 5, fig. 13, p. 47.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 150.

Black River (Platteville): Fox River, near Appleton, Wisconsin.

DICTYONEMA NORVEGICUM Kjerulf. See *Dictyonema flabelliforme*.

**Dictyonema obovatum** Gurley.

*Dictyonema obovatum* Gurley, Ann. Rep. Geol. Surv. Arkansas, 1890, 3, 1892, p. 418; Jour. Geol., 4, 1896, p. 300.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 151.

Chazy (Normanskill-Stringtown): Near Crystal Springs, Arkansas.

**Dictyonema parallelum** Gurley.

*Dictyonema parallelum* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 37, 38, pl. 4, fig. 2, text fig. 47.

Niagaran dolomite: Hamilton, Ontario.

**Dictyonema percrassum** Gurley.

*Dictyonema percrassum* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 35, 36, figs. 44, 45.

Niagaran dolomite: Hamilton, Ontario.

**Dictyonema perexille** Gurley.

*Dictyonema delicatulum* Dawson (not Lapworth), Canadian Nat. Geol., 10, 1883, p. 461 (footnote).—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 96.

Canadian: Point Levis, Quebec (Levis); St. John, New Brunswick (Bretonian—Div. C3d).

DICTYONEMA PERGRACILIS Hall. See *Desmograptus pergracilis*.

**Dictyonema pertenuae** Foerste.

*Dictyonema pertenuae* Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 107, pl. 8, fig. 27a, b; Geol. Surv. Ohio, Pal., 7, 1893, p. 600, pl. 27, figs. 27a, b.—Gurley, Jour. Geol., 4, 1896, p. 308.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 153, figs. 59, 60.

Upper Medinan (Brassfield): Soldiers Home near Dayton, Ohio.

**Dictyonema polymorphum** Gurley.

*Dictyonema tenellum* Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pl. 1, fig. 13 (not description, p. 576); Bull. Mus. Univ. State Missouri, 1, 1884, pl. 1, fig. 13 (not description, p. 26).



**Dictyonema polymorphum**—Continued.

*Calyptograptus subretiformis* Spencer (part), Trans. Acad. Sci. St. Louis, 4, 1884, pl. 4, fig. 2; Bull. Mus. Univ. State Missouri, 1, 1884, pl. 4, fig. 2.

*Dictyonema polymorphum* (Gurley MS.) Ruedemann, Mem. New York State Mus., 11, 1908, p. 158, pl. 2, fig. 3; pl. 3, figs. 4, 5, 6; p. 160, figs. 60–72.—Bassler, Bull. U. S. Nat. Mus., No. 65, 1909, p. 24, pl. 4, fig. 11.

Niagaran: Hamilton, Ontario; Middleport, New York (Rochester).

*Holotype*.—Cat. No. 54278, U.S.N.M.

**Dictyonema quadrangulare** (Hall).

*Dictyonema quadrangulare* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 138, pl. 20, fig. 5.—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 96.

Canadian: Point Levis, Quebec (Levis, *Clonograptus* zone); St. John, New Brunswick (Bretonian—Div. C3d).

**Dictyonema rectilineatum** Ruedemann.

*Dictyonema* n. sp. Ruedemann, New York State Pal. Ann. Rep., 1902, p. 570.

*Dictyonema rectilineatum* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 607–609, pl. 3, figs. 9, 10, text fig. 29.

Canadian: Deepkill, Rensselaer County, New York (*Deepkill*, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *dentatus* zone).

**Dictyonema retiforme** (Hall).

*Gorgonia?* *reteformis* Hall, Rep. Surv. 4th Geol. Dist. New York, 1843, p. 115, fig. 1.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 260, figs.

*Dictyonema retiformis* Hall, Pal. New York, 2, 1852, p. 174, pl. 40F, fig. 1a, b.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 55, pl. 7, fig. 1.—Hall, Geol. Surv. Canada, dec. 2, 1865, p. 12, fig. 10; 20th Rep. New York State Cab. Hist., 1868, p. 178, fig. 11; rev. ed., 1870, p. 210, fig. 11; p. 225.—Nicholson, Mon. British Grapt., 1872, p. 129, fig. 69.—Zittel, Handb. Pal., 1, 1879, p. 289, fig. 195.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 14, 23, 24, pl. 3, figs. 1, 1a, 2, 2a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 573, pl. 3, fig. 1, 2.—Miller, N. A. Geol. Pal., 1889, p. 185, text fig. 168.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, p. 192, 193.—Gurley, Jour. Geol., 4, 1896, pp. 96, 308.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 575, fig. 145.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 133, fig. 27; Bull. New York State Mus., 45, 1901, pp. 133, 134, fig. 27.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 25, fig. 33.—Ruedemann, Mem. New York State Mus., 11, 1908, p. 155, fig. 64, pl. 3, fig. 1.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 18, 19, figs. 19, 20.

Clinton (Rochester): Rochester, Lockport, etc., New York; Hamilton, Ontario.

**Dictyonema robustum** Hall.

*Dictyonema robusta* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 137, pl. 20, figs. 3, 4.

Canadian (Levis, *Clonograptus* zone): Point Levis, Quebec.

**Dictyonema scalariforme** Foerste.

*Dictyonema scalariforme* Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 108, pl. 8, figs. 28, 29; Geol. Surv. Ohio, Pal., 7, 1893, p. 600, pl. 27, figs. 28, 29.—Gurley, Jour. Geol., 4, 1896, p. 308.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 153, pl. 1, fig. 3, text figs. 61–63.

Upper Medinan (Brassfield): Soldiers Home, Dayton, Ohio.

Clinton shale: Near Clinton, New York.

**DICTYONEMA SOCIALE** Salter. See *Dictyonema flabelliforme*.

**Dictyonema spenceri** Gurley.

*Dictyonema spenceri* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 36, 37, pl. 4, fig. 1, text fig. 46.

Niagaran dolomite: Hamilton, Ontario.

**Dictyonema spiniferum** Ruedemann.

*Dictyonema spiniferum* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 151, pl. 1, fig. 4, text figs. 55, 56.

Chazy (Normanskill): Glenmont, Albany County, New York.

**Dictyonema splendens** Billings.

*Dictyonema splendens* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 12, fig. 2, 2a.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 27; Trans. Acad. Sci. St. Louis, 4, 1884, p. 577.—Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 108.

*Dictyonema* cf. *splendens* Clarke, Mem. New York State Mus., 3, 1900, p. 64.

Silurian or Helderbergian: Between Cape Gaspe and Cape Rosier, Canada.

**Dictyonema stenactinotum** Gurley.

*Dictyonema stenactinotum* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 30, 31, pl. 3, fig. 2, text fig. 34.

Niagaran dolomite: Hamilton, Ontario.

**Dictyonema subretiforme** (Spencer).

*Calyptraptus subretiformis* Spencer, Canadian Nat., n. s., 8, 1880, pp. 458, 460; *ibid.*, 10, 1882, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, p. 28, pl. 4, fig. 1 (not fig. 2); Trans. Acad. Sci. St. Louis, 4, 1884, p. 578, pl. 4, fig. 1 (not fig. 2).—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.

*Dictyonema subretiforme* Ruedemann, Mem. New York State Mus., 11, 1908, p. 162, pl. 2, figs. 1, 2.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 26–28, figs. 30, 31.

Niagaran: Hamilton, Ontario; Middleport, New York (Rochester).

**DICTYONEMA TENELLUM** Spencer (part). See *Dictyonema polymorphum*.

**Dictyonema tenellum** Spencer.

*Dictyonema tenellum* Spencer, Canadian Nat., n. s., 8, 1878, pp. 458, 459; *ibid.*, 10, 1882, p. 165; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 576 (not pl. 1, fig. 13); Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 26 (not pl. 1, fig. 13).—Miller, N. A. Geol. Pal., 1889, p. 185.—Gurley, Jour. Geol., 4, 1896, pp. 96, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 23–30, pl. 2, fig. 4, text figs. 32, 33.

Niagaran dolomite: Hamilton, Ontario.

**Dictyonema websteri** Dawson.

*Dictyonema websteri* Dawson, Acadian Geol., Suppl. Chap., 1860, p. 60, fig. 46; *ibid.*, 2d ed., 1868, p. 563, fig. 196; Canadian Nat. Geol., 5, 1860, p. 139, fig. 2—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 225.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 576; Bull. Mus. Univ. State Missouri, 1, 1884, p. 26.—Ruedemann, Proc. and Trans. Nova Scotian Inst. Sci., 11, pt. 4, 1908, p. xlvii.

Silurian: Kings County, Nova Scotia.

**DICTYOPHYTON BECKI** Miller. See *Lithodictyon becki*.

**Dictyophytra** Rauff.

Not recognized.

*Dictyophytra* (? in place of *Dictyophyton*) Rauff, Palaeontographica, 40, 1894, p. 249.

Observation.—*Dictyophytra* was proposed by Rauff probably to replace *Dictyophyton*, but its description was not given.



**DICTYOPHYTRA?** WALCOTTI Rauff. See *Cyathophycus walcotti*.

**DICTYORHABDUS** Walcott.

Genotype: *D. priscus* Walcott.

*Dictyorhabdus* Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 165.

***Dictyorhabdus priscus*** Walcott.

*Dictyorhabdus priscus* Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 165, pl. 3, figs. 1-5.

Black River (Harding): Canon City, Colorado.

**DICTYOSTOMA** Spencer. See *Dictyostroma* Nicholson.

**DICTYOSTOMA RETICULATUM** Spencer. See *Ceramoporella reticulata*.

**DICTYOSTROMA** Nicholson.

Genotype: *D. undulatum* Nicholson.

*Dictyostroma* Nicholson, Pal. Ohio, 2, 1875, p. 254.—Nicholson and Murie, Jour.

Linn. Soc. London, Zool., 14, p. 224.—Zittel, Handb. Pal., 1, 1879, p. 286.—

Dawson, Quart. Jour. Geol. Soc. London, 35, 1879, p. 56.—Nicholson, Mon.

British Strom., Pal. Soc., 1886, p. 85.—Waagen and Wentzel, Mem. Geol.

Surv. Indica, Pal. Indica, 13th ser., 1, 1888, p. 944.—Miller, N. A. Geol. Pal.,

1889, p. 158.—Parks, Univ. Toronto Studies, Geol. Ser., 5, 1908, p. 56.

*Dictyostroma* Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 601; Bull. Mus.

Univ. State Missouri, 1, 1884, p. 51.

*Milleria* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, expl. of pl. 46 (Genotype: *M. laminata* Davis).

Observation.—*Dictyostroma* is not a stromatoporoid, but is a coral closely allied if not identical with *Cœnites*.

**DICTYOSTROMA RETICULATUM** Whiteaves. See *Ceramoporella reticulata*.

***Dictyostroma undulatum*** Nicholson.

*Dictyostroma undulatum* Nicholson, Pal. Ohio, 2, 1875, p. 254, pl. 24, figs. 6, 6c.—

Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878, p. 224.—Miller, N. A.

Geol. Pal., 1889, p. 158, fig. 101.—Nicholson, Mon. British Strom., 1892, pp.

85, 232.—Parks, Univ. Toronto Studies, Geol. Ser., 5, 1908, p. 57, pl. 14, figs.

3, 4; pl. 15, figs. 3, 4, 7, 8.

*Alveolites stromatoporoides* Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 55.

*Milleria laminata* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, fig. 9.

Niagaran (Louisville): Louisville, Kentucky.

**DIDYMOGRAPSUS** Pictet. See *Didymograptus* McCoy.

**DIDYMOGRAPSUS CADUCEUS** Salter. See *Tetragraptus serra* and *T. similis*.

**DIDYMOGRAPSUS CONVEXUS** Gurley. See *Didymograptus sagittarius*.

**DIDYMOGRAPSUS DIVARICATUS**. See *Dicellograptus divaricatus*.

**DIDYMOGRAPSUS GEMINUS** Nicholson. See *Didymograptus nanus*.

**DIDYMOGRAPSUS MURCHISONI FURCILLATUS** Gurley. See *Didymograptus furcillatus*.

**DIDYMOGRAPTUS** McCoy.

Genotype: *D. murchisoni* McCoy.

*Didymograptus* McCoy, British Pal. Fossils, pt. 2, 1851, p. 9.—Chapman, Canadian Jour., n. s., 1, 1856, p. 389.—Pictet, Traité de Pal., 2d ed., 4, 1857, p.

474.—Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 9, 138.—Car-

ruthers, Geol. Mag., 5, 1868, pp. 73, 128.—Nicholson, Ann. Mag. Nat. Hist.,

4th ser., 5, 1870, p. 337; Mon. British Grapt., 1872, p. 103.



**DIDYMOGRAPTUS**—Continued.

*Didymograptus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pp. 217, 234; rev. ed. (1870), p. 251.—Zittel, Handb. Pal., 1, 1879, p. 298.—Tullberg, Sveriges Geol. Unders., ser. C, No. 55, 1883, p. 12.—Hermann, Geol. Mag., dec. 3, 3, 1886, p. 14.—Miller, N. A. Geol. Pal., 1889, p. 185.—Törnquist, Lunds Univers. Arsskrift, 26, No. 4, 1890, p. 15.—Barrois, Ann. Soc. Geol. du Nord, 21, Lille, 1893, p. 108.—Holm, Sveriges Geol. Unders., ser. C, No. 150, 1895, p. 15; Geol. Foren. Stockholm Forhandl., 17, 1895, p. 331; Geol. Mag., dec. 4, 2, 1895, pp. 433, 439, pl. 14, figs. 1–3, 7, 8.—Nicholson and Murie, Geol. Mag., dec. 4, 2, 1895, pp. 530–535, figs.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 266; Nat. Sci., 9, 1896, p. 191.—Walther, Zeits. d. d. geol. Gesell., 49, 1897, p. 251.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 587.—Ruedemann, Amer. Nat., 32, 1898, p. 5; Zittel-Eastman Textb. Pal., 1, 1900, p. 118.—Törnquist, Lunds Univers. Arsskrift, 37, No. 5, 1901, p. 10.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1901, p. 5.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 666, 668.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 30.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 247; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 129.

***Didymograptus acutidens* Lapworth.**

*Didymograptus affinis* Hopkinson, Quart. Jour. Geol. Soc., 31, 1875, pl. 33, figs. 6b, c.

*Didymograptus acutidens* (Lapworth MS.) Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 25, pl. 2, figs. 3a–d.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 683, 684, pl. 13, fig. 15, text figs. 77, 78.

Canadian: St. Davids District, Wales, and South Shropshire, England (Arenig); Deepkill, Rensselaer County, New York (Deepkill, *Didymograptus bifidus* zone).

**DIDYMOGRAPTUS AFFINIS** Hopkinson. See *Didymograptus acutidens*.

***Didymograptus arcuatus* (Hall).**

*Graptolithus arcuatus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 79, pl. 2, figs. 6–10.

*Graptolithus* (Monoprion) *arcuatus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed. (1870), p. 260; p. 223.

*Didymograptus arcuatus* Gurley, Jour. Geol., 4, 1896, p. 96 (gen. ref.).

*Didymograptus arcuatus* Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. li (gen. ref.).

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

***Didymograptus bifidus* (Hall).**

*Graptolithus bifidus* Hall, Canadian Nat. and Geol., 3, 1858, p. 164; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 130; Geol. Surv. Canada, dec. 2, 1865, p. 73, pl. 1, figs. 16–18; pl. 3, figs. 9, 10.

*Graptolithus* (Monoprion) *bifidus* Hall, 20th Rep. New York State Cab. Nat. Hist. 1869, p. 226, pl. 3, figs. 13, 14; rev. ed., 1870, p. 241; p. 223.

*Didymograptus bifidus* Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 136; Ann. Mag. Nat. Hist., 4th ser., 5, p. 346, fig. 7.—Hopkinson, Quart. Jour. Geol. Soc., 31, 1875, p. 646, pl. 33, figs. 8a–e.—Brögger, Die sil. Etagen 2, 3, etc. Kristiania, 1882, p. 41.—Herrmann, Geol. Mag., 3d ser., 3, 1886, p. 15.—Ami, Geol. Surv. Canada Rep., 2d ser., 3, pt. 2, 1889, p. 116k.—Barrois, Ann. de la Soc. Geol. du Nord., 20, 1892, p. 92.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 511.—Elles and Wood, Mon. British Grapt., pt. 1, Pal.

**Didymograptus bifidus**—Continued.

Soc., 1901, p. 42, figs. 26a–b, pl. 4, figs. 1a–f; p. 6, figs. 1, 2.—Ruedemann, New York State Pal. Ann. Rep., 1902, pp. 566, 567; Mem. New York State Mus., 7, pt. 1, 1904, pp. 689–692, pl. 15, figs. 1–3, text figs. 86, 87.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 31, fig. 47c, 48.

Canadian: Point Levis, Quebec (Levis, *Didymograptus bifidus* zone); Deepkill, Rensselaer County, New York (Deepkill, *D. bifidus* zone); Nevada; South Scotland and Wales (Arenig); England; Scandinavia; Bohemia; France.

**Didymograptus bipunctatus** (Gurley).

*Didymograptus bipunctatus* Gurley, Jour. Geol., 4, 1896, p. 65, pl. 5, figs. 7, 7a.

Canadian (Levis): Near Point Levis, Quebec.

*DIDYMOGRAPTUS CADUCEUS* of authors. See *Tetragraptus similis*, *Didymograptus* (*Isograptus*) *caduceus* and *T. similis*.

**Didymograptus (Isograptus) caduceus** (Salter).

*Didymograptus caduceus* Salter (part), Quart. Jour. Geol. Soc. London, 9, 1853, p. 87, fig. 1a; *ibid.*, 19, 1863, p. 138, fig. 13a.

*Graptolithus caduceus* Chapman, Canadian Jour., n. s., 1, 1856, p. 390, fig. 3.

*Graptolites* (*Didymograptus*) *caduceus* McCoy, Pal. Geol. Surv. Victoria, Prodr. Pal. Victoria, dec. 2, 1874, p. 30, pl. 20, figs. 3–5a.

*Didymograptus caduceus* T. S. Hall, Proc. Royal Soc. Victoria, n. s., 8, 1896, p. 69.

*Didymograptus* (*Isograptus*) *caduceus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 693–698, pl. 15, figs. 6, 7, text fig. 89.

*Tetragraptus caduceus* Brögger, Die Sil. Etagen 2, 3, Kristiania, 1882, p. 39.

*Didymograptus gibberulus* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 16, 1875, p. 271, pl. 7, figs. 3, 3a, 3b.—Moberg, Geol. Foren. Stockh. Forh., 13, 1891, p. 221.—Holm, Sver. Geol. Und. Afh. och upps., ser. C, No. 150, 1895, p. 18.—Elles, Quart. Jour. Geol. Soc., 54, 1898, p. 496.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 52, figs. 33a, b; pl. 2, figs. 9a–e.

*Didymograptus* (*Isograptus*) *gibberulus* Roemer and Frech, Leth. Pal., 1, 1897, p. 93, fig. 161.

*Isograptus gibberulus* Moberg, Geol. Foren. Stockh. Forh., 14, 1892, p. 346, pl. 8, figs. 3–7.—Törnquist, Lunds Univ. Årsskrift, 37, Afd. 2, 1901, p. 23, pl. 3, figs. 16–19.

*Tetragraptus byronoides* Etheridge, jr., Ann. Mag. Nat. Hist., 4th ser., 1874, 14, p. 2, pl. 3, figs. 3, 4.

*Phyllograptus stella* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 658, pl. 34, fig. 6.

Lower Ordovician: England (Skiddaw); Wales (Arenig); Scandinavia; Australia; Deepkill, Rensselaer County, New York (Deepkill, *Didymograptus bifidus* zone); Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Arkansas.

**Didymograptus caduceus nanus** Ruedemann.

*Didymograptus caduceus nanus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 698, pl. 15, figs. 8, 9, text fig. 90.

Canadian: Deepkill, Rensselaer County, New York (Deepkill, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *D. dentatus* zone); Arkansas.

**Didymograptus cuspidatus** Ruedemann.

*Didymograptus cuspidatus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 684, 685, pl. 13, fig. 16, text figs. 79, 80.

Canadian (Deepkill, *Diplograptus dentatus* zone): Mt. Moreno, Columbia County, New York.



*DIDYMOGRAPTUS DIVARICATUS* Nicholson. See *Dicellograptus divaricatus*.

*DIDYMOGRAPTUS? ELEGANS* Ruedemann. See *Monograptus elegans*.

***Didymograptus ellesæ* Ruedemann.**

*Didymograptus* (*Leptograptus*) (part.) Ruedemann, New York State Pal. Ann. Rep., 1902, p. 589.

*Didymograptus ellesæ* Ruedemann, Mem. New York State Mus., 7, 1904, pt. 1, pp. 682, 683, pl. 14, figs. 22–24, text figs. 75, 76. (Corrected to *ellesæ* in 1908, Mem. 11, pt. 2, p. 134.)

Canadian (Deepkill, *Didymograptus bifidus* zone): Deepkill, Rensselaer County, New York.

***Didymograptus euodus* Lapworth.**

*Didymograptus euodus* Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 645, pl. 35, fig. 1a–c.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., p. 21, pl. 1, figs. 10a, b.

Ordovician (Lower Llandeilo): Abereiddy Bay, St. David's District, Wales.

Canadian (Upper *Tetragraptus* zone): Twelve miles west of Little Rock, Arkansas.

***Didymograptus extensus* (Hall).**

*Graptolithus extensus* Hall, Geol. Surv. Can. Rep., 1858, p. 132; Canadian Nat. Geol., 3, 1858, p. 166; Geol. Surv. Canada, dec. 2, p. 80, pl. 2, figs. 11–16.

*Graptolithus* (*Monoprion*) *extensus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 195, pl. 3, fig. 12; rev. ed., 1870, p. 225, pl. 3, fig. 12, p. 228.

*Didymograptus extensus* Nicholson, Ann. Mag. Nat. Hist., 4th ser., v. 1870, 5, 341, pl. 7, figs. 2, 2a.—Hopkinson, Quart. Jour. Geol. Soc., 31, 1875, p. 642, pl. 33, figs. 1a–1d.—Brögger, Die Sil. Etagen 2, 3, 1882, p. 40, Kristiania.—Herrmann, Geol. Mag., dec. 3, 3, 1886, p. 14.—Lapworth, Proc. and Trans. Roy. Soc. Can., 4, 1887, pp. 168, 184.—Ami, Geol. Sur. Can. Rep., 2d ser., 3, pt. 2, 1889, p. 116k.—Roemer and Frech, Leth. Pal., 1, 1897, p. 591.—Elles, Quart. Jour. Geol. Soc., London, 54, 1898, p. 504.—Tornquist, Lunds Univ. Årsskrift, 37, Af. 2, Nr. 5, 1901, p. 14, pl. 1, figs. 25–30.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 8, pl. 1, figs. 1a, b., text figs. 4a–d.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 668–671, pl. 13, figs. 17, 18; pl. 14, figs. 1–4; text figs. 62–65.

*Didymograptus extensus* Gurley, Jour. Geol., 4, 1896, p. 96 (gen. ref.).

*Graptolites* (*Didymograptus*) *extensus* McCoy, Geol. Surv. Victoria, Prodr. Pal., dec. 2, 1875, p. 29, pl. 20, figs. 1, 1a.

*Graptolithus constrictus* Hall (part), Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 76, pl. 1, figs. 23–27.

Canadian: Point Levis, Quebec (*Levis*, *Didymograptus* zone); Deepkill, Rensselaer County, New York (*Deepkill*, *Tetragraptus* zone); Arkansas; South Scotland; Wales (*Arenig*); Wales (*Skiddaw*); Christiania; Scania; Australia.

***Didymograptus extenuatus* (Hall).**

*Graptolithus extenuatus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 75, pl. 1, figs. 21, 22.

*Graptolithus* (*Monoprion*) *extenuatus* Hall, 20th Rep. New York State Cab. Hist., 1868, p. 226; rev. ed., 1870, p. 241.

*Didymograptus extenuatus* Gurley, Jour. Geol., 4, 1896, p. 96 (gen. ref.).

*Didymograptus extenuatus* Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. li (gen. ref.).

Canadian (*Levis*, *Diplograptus dentatus* zone): Point Levis, Quebec.



**Didymograptus filiformis** Tullberg.

*Didymograptus filiformis* Tullberg, Geol. Fören. Stockh. Forh., 5, 1880, 42, pl. 2, figs. 8-11.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 6, 1880, p. 20.—Brögger, Die sil. Etagen 2, 3, 1882, p. 39.—Tullberg, Sver. Geol. Und., Afh. och upps. ser. C, 50, 1882, p. 22.—Törnquist, Lunds Univ. Arsskrift, 37, Af. 2, nr. 5, 1901, pl. 3, figs. 6-9.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 32, fig. 20.—Ruedemann New York State Pal., Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 686, 687, pl. 14, figs. 8-14.

Lower Ordovician: Scania, Westrogothia; Norway; Scotland (Arenig); Deepkill, Rensselaer County, and Mount Moreno, near Hudson, New York (Deepkill, *Tetragraptus* and *Diplograptus dentatus* zones).

**Didymograptus forcipiformis** Ruedemann.

*Didymograptus forcipiformis* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 699, 700, pl. 15, figs. 10-13; text fig. 91.

Canadian: Mount Moreno, Columbia County, New York (Deepkill, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *D. dentatus* zone).

*DIDYMOGRAPTUS FRUTICOSUS* Etheridge. See *Tetragraptus fruticosus*.

**Didymograptus furcillatus** Lapworth.

*Didymograptus furcillatus* Lapworth, Quar. Jour. Geol. Soc. London, 31, 1875, p. 649, pl. 35, figs. 3a-3d.

*Didymograptus murchisoni furcillatus* Gurley, Jour. Geol., 4, 1897, p. 97.

Ordovician: Wales (Lower Llandeilo): Point Levis, Quebec (Levis).

*DIDYMOGRAPTUS GIBBERULUS* Nicholson. See *Didymograptus (Isograptus) caduceus*.

**Didymograptus gracilis** Törnquist.

*Didymograptus gracilis* Törnquist, Under. ofver. Siljans. Graptoliter 1 (Aftryck ur Lunds Univ. Arsskrift. 26), 1891, p. 17, pl. 1, figs. 9-12.—Holm, Geol. Fören. Stockh. Forh. 17, H 3, 1895, pl. 1, figs. 7, 8.—Elles, Quar. Jour. Geol. Soc., 54, 1895, p. 506.—Elles and Wood, Mon. British Grapt., pt. 1, 1901, p. 24, pl. 2, fig. 2.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 679-681, figs. 15-21, pl. 14.

*Didymograptus (Leptograptus) gracilis* Ruedemann, New York State Pal., Ann. Rep., 1902, p. 589, fig. 17.

Lower Ordovician: Dalarne, Sweden (*Phyllograptus* shales); England (Skiddaw); Deepkill, Rensselaer County, etc., New York (Deepkill, *Didymograptus bifidus* zone).

**Didymograptus incertus** Ruedemann.

*Didymograptus* sp. nov. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 570.

*Didymograptus incertus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 700, 701, pl. 15, fig. 14, text fig. 92.

Canadian (Deepkill, *Diplograptus dentatus* zone): Deepkill, Rensselaer County, New York.

**Didymograptus indentus** (Hall).

*Graptolithus indentus* Hall, Canadian Nat. Geol., 3, 1858, p. 163; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 128; Geol. Surv. Canada, dec. 2, 1865, p. 74, pl. 1, fig. 20.

*Graptolithus (Monoprion) indentus* Hall, 20th Rep. New York State Cab. Hist., 1868, p. 226; rev. ed., 1870, p. 260; p. 223.

**Didymograptus indentus**—Continued.

*Didymograptus indentus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 647, pl. 33, figs. 7a-7c.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 93.—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 99.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 510.

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); St. John, New Brunswick (Bretonian-Div. C3d); Wales (Skiddaw).

*DIDYMOGRAPTUS INDENTUS* var. *NANUS* Lapworth. See *Didymograptus nanus*.

**Didymograptus nanus** (Lapworth).

*Didymograptus geminus* Nicholson, Quar. Jour. Geol. Soc., 24, 1868, p. 134, pl. 5, figs. 8, 9; Ann. and Mag. Nat. Hist., ser. 4, 5, 1870, p. 346, fig. 6b.

*Didymograptus indentus* var. *nanus* Lapworth, Quar. Jour. Geol. Soc., 31, 1875, p. 647, pl. 33, fig. 7d; pl. 35, figs. 4a-c.—Elles, Quar. Jour. Geol. Soc., 54, 1898, p. 511.

*Didymograptus nanus* Elles and Wood, Mon. British Grapt. pt. 1, Pal. Soc., 1901, p. 47, pl. 4, figs. 5a-h.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 692, 693, pl. 15, figs. 4, 5; text fig. 88.

Lower Ordovician: Wales (Arenig); England (Skiddaw); Deepkill, Rensselaer County, New York (Deepkill, *Didymograptus bifidus* zone).

**Didymograptus nicholsoni planus** Elles and Wood.

*Didymograptus nicholsoni* var. *planus* Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 29, pl. 2, figs. 5a, b.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 685, 686, pl. 13, figs. 10-14, text figs. 82, 83.

Lower Ordovician: England (Skiddaw); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* zone).

**Didymograptus nitidus** (Hall).

*Graptolithus nitidus* Hall, Geol. Surv. Canada Rep., 1857, 1858, p. 129; Can. Nat. and Geol., 3, 1858, p. 163; Canadian Org. Rem., dec. 2, 1865, p. 69, pl. 1, figs. 1-9.

*Graptolithus* (Monoprius) *nitidus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226, pl. 3, figs. 8, 9; rev. ed., 1870, p. 234, pl. 3, figs. 8, 9, p. 223.

*Didymograptus nitidus* Nicholson (part.), Quar. Jour. Geol. Soc. London, 24, 1868, p. 135.—Etheridge, jr., Ann. Mag. Nat. Hist., 4th ser., 14, 1874, 6, pl. 3, fig. 20.—Herrmann, Geol. Mag., dec. 3, 3, 1886, p. 15.—Barrois, Ann. de la Soc. Geol. du Nord, 1892, 20, p. 91.—Matthew, Trans. Roy. Soc. Can., 10, sec. 4, 1893, p. 98.—Elles (part.), Quar. Jour. Geol. Soc., 54, 1896, 499-502; p. 500, fig. 19; p. 501, fig. 20.—Roemer and Frech, Leth. Geog., 1, Theil, Leth. Pal., 1, Lief., 3, 1897, p. 591, fig. 160.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 499, figs. 19, 20, p. 500.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 10, pl. 1, figs. 2a-c, figs. 5a-d.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 554, 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 671-674, pl. 13, figs. 1-4; pl. 14, figs. 5, 6, text figs. 66-70.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 31, fig. 47a, 49a.—Hoek, Neues Jahrb. Min. Geol. Pal., 34, 1912, p. 220, pl. 13, figs. 8, 9.

*Didymograptus* (*Graptolithus*) *nitidus* Nicholson, Mon. British Grapt., 1872, p. 80, fig. 45.

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); St. John, New Brunswick (Bretonian—Div. C3d); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* zone); Arkansas; England (Skiddaw); France; Australia; Norway; Argentina.



**Didymograptus nitidus grandis** Ruedemann.

*Didymograptus nitidus* var. *grandis* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 674, pl. 13, fig. 5.

Canadian (Deepkill, Tetragraptus zone): Deepkill, Rensselaer County New York.

**Didymograptus patulus** (Hall).

*Graptolithus patulus* Hall, Geol. Surv. Can., Rep. for 1857, 1858, p. 131; Can. Nat. and Geol., 3, 1858, p. 165; Geol. Surv. Canada, Canadian Org. Rem., dec. 2, 1865, p. 71, pl. 1, figs. 10-15.

*Didymograptus patulus* Hopkinson, Quar. Jour. Geol. Soc., 31, 1875, 644, pl. 33, figs. 4a-e.—Linnarsson, Sver. Geol. Und. Afh. och Upps., ser. C, No. 31, 1879, p. 5.—Brögger, Die sil. Etagen 2, 3, Kristiania, 1882, p. 39.—Herrmann (part.), Geol. Mag., dec. 3, 3, 1886, p. 14.—Matthew, Proc. and Trans. Royal Soc. Can., 10, sec. 4, 1893, p. 98; *ibid.*, 11, 1894, p. 114.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 13, pl. 1, figs. 8a-c; text figs. 8a-b.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 674-676, pl. 13, figs. 8, 9; pl. 14, fig. 7; text figs. 71-73 (73 on p. 677).—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 31, figs. 47b, 49b.

Canadian: Point Levis, Quebec (Levis); St. John, New Brunswick (Bretonian—Div. C3d); Deepkill, Rensselaer County, New York (Deepkill, Tetragraptus zone).

**Didymograptus pennatulus** (Hall).

*Graptolithus pennatulus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 7, fig. 1; p. 82, pl. 3, figs. 1-8; pl. 5, fig. 9.

*Graptolithus* (*Didymograptus*) *pennatulus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 173, fig. 2; rev. ed., 1870, p. 206, fig. 2.

*Graptolithus* ((*Monoprion*)) *pennatulus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 223.

*Didymograptus pennatulus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 643, pl. 33, figs. 3a-3e.—Zittel, Handb. Pal., 1, 1879, p. 298, fig. 204.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 90.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1901, p. 18, pl. 1, fig. 7.

*Didymograpsus pennatulus* Gurley, Jour. Geol., 4, 1896, p. 97 (gen. ref.).

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); England (Arenig).

**Didymograptus perflexus** Gurley.

*Didymograpsus perflexus* Gurley, Jour. Geol., 4, 1896, p. 66.

Canadian: Summit, Nevada.

*Cotypes*.—Cat. No. 54344, U.S.N.M.

**DIDYMOGRAPTUS RECTUS** Ruedemann. See *Monograpsus rectus*.

**DIDYMOGRAPTUS SAGITTARIUS** Dale. See *Didymograptus sagitticaulis*.

**Didymograptus sagitticaulis** Gurley.

*Graptolithus sagittarius* Hall (not Hisinger), Pal. New York, 1, 1847, p. 272, pl. 74, fig. 1.—Chapman, Canadian Jour., n. s., 1, 1856, p. 390, fig. 6.—Walcott, Trans. Albany Inst., 10, 1883 (adv. sheet, 1879, p. 34).

*Monograpsus sagittarius* Whitfield, Am. Jour. Sci., 3d ser., 26, 1883, p. 380.

*Didymograptus sagittarius* Lapworth, Trans. Roy. Soc. Canada, 5, sec. 4, 1886, p. 180f, 183f; Geol. Surv. Canada Ann. Rep., 2d ser., 3, pt. 1, 1889, p. 95B.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 338.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, p. 411.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.

*Didymograpsus sagitticaulis* Gurley, Jour. Geol., 4, 1896, p. 68.

**Didymograptus sagitticaulis**—Continued.

*Didymograptus convexus* Gurley, Jour. Geol., 4, 1896, p. 67, pl. 5, fig. 8.

*Didymograptus sagitticaulis* Ruedemann, Mem. New York State Mus., 11, pt. 2-1908, pp. 248-251, pl. 14, fig. 3, text figs. 151-155.

Chazy (Normanskill): Kenwood, Stockport, and near Poughkeepsie, New York; Canada; Arkansas (Stringtown); Tennessee (Athens).

*Plesiotypes*.—Cat. No. 54255, U.S.N.M. (Gurley types of *D. convexus*.)

**Didymograptus serratulus** (Hall).

*Graptolithus serratulus* Hall, Pal. New York, 1, 1847, p. 274, pl. 74, fig. 5a, b.—Chapman, Canadian Jour., n. s., 1, 1856, p. 390, text fig. 8.—Hall, New York State Cab. Nat. Hist., 20th Rep., 1867, p. 223f.—Walcott, Trans. Albany Inst., 10, 1883, p. 35 (adv. sheets, 1879).

?*Graptolithus* (*Monograptus*) *serratulus* Whitfield, U. S. Geog. Surv., 100th Mer., Lieut. Wheeler's Rep., 4, 1877, p. 19.

*Graptolithus* (*Monoprion*) *serratulus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed., 1870, p. 260.

*Didymograptus serratulus* Walcott, Geol. Soc. Amer., Bull. 1, 1890, p. 338.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, 1892, p. 411.—Roemer and Frech, Leth. Pal., 1, 1897, p. 589.—Ruedemann, Bull. New York State Mus., 42, 1901, pp. 497, 541.—Elles and Wood, Mon. British Grapt., pt. 1, 1901, p. 29, pl. 2, figs. 7a, b, text fig. 18a-b.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 251-253, pl. 14, fig. 4, text figs. 156-159.

*Didymograptus serratulus* Pictet, Traite de Pal., 2d ed., 4, 1857, p. 474, pl. 108, fig. 23.

Middle Ordovician: Kenwood, Stockport, etc., New York; Arkansas (Normanskill); Great Britain (Glenkiln).

**Didymograptus serratulus juvenalis** Ruedemann.

*Didymograptus serratulus juvenalis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 252, fig. 156.

Chazy (Normanskill): Kenwood, New York.

**DIDYMOGRAPTUS SEXTANS** Nicholson. See *Dicellograptus sextans*.

**Didymograptus similis** (Hall).

*Graptolithus similis* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 78, pl. 2, figs. 1-5.

*Didymograptus similis* Gurley, Jour. Geol., 4, 1896, p. 295 (gen. ref.).

*Didymograptus similis* Ruedemann, New York State Pal., Ann. Rep., 1902, pp. 566, 567; Mem. New York State Mus., 7, pt. 1, 1904, pp. 677-679, pl. 14, figs. 25-29, text figs. 73, 74 (73 on p. 678).

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); Deepkill, Rensselaer County, New York (*Deepkill*, *Didymograptus* and *Diplograptus* zones); Wales (Arenig); Norway; Sweden.

**Didymograptus spinosus** Ruedemann.

*Didymograptus spinosus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 688, 689, pl. 14, figs. 30-32, text figs. 84, 85.

Canadian (*Deepkill*, *Diplograptus dentatus* zone): Mount Moreno, Columbia County, New York.

**Didymograptus subtenuis** (Hall).

*Graptolithus tenuis* (Portlock?) Hall, Pal. New York, 1, 1847, p. 272, pl. 74, figs. 2a-d.

*Graptolithus subtenuis* Hall, in Miller's Amer. Pal. Foss., 1st ed., 1877, p. 244.—Walcott, Trans. Albany Inst., 1883, 10 (adv. sheets, p. 35).—Gurley, Jour. Cincinnati Soc. Nat. Hist., 16, 1892, p. 156.



**Didymograptus subtenuis**—Continued.

- Dicellograptus tenuis* Lapworth, Roy. Soc. Canada Trans. 5, sec. 4, 1886, p. 178.  
*Leptograptus tenuis* Lapworth, Roy. Soc. Canada Trans., 10, sec. 4, 1886, p. 183.  
*Leptograptus subtenuis* Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 338.  
*Leptograptus subtenuis* Gurley, Jour. Geol., 4, 1896, p. 296 (gen. ref.).  
*Didymograptus tenuis* Ruedemann, Bull. New York State Mus., 42, 1901, p. 540f.  
*Didymograptus subtenuis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 253–255, pl. 14, figs. 1, 2, text figs. 160, 161.  
 Chazyan (Normanskill): Kenwood, Mount Moreno, and Stockport, New York; Canada.

**Didymograptus superectes** Lapworth.

- Didymograptus superectes* Lapworth, Cat. West. Scot. Foss., pl. 3, fig. 74, a, b; Proc. Belfast Field Club, 1877, p. 142, pl. 7, figs. 15a, b.—Elles and Wood, Mon. British. Grapt., Pal. Soc., pt. 1, 1901, p. 19, pl. 1, figs. 9a, b.  
 Middle Ordovician: South Scotland (Glenkiln); Oklahoma (Normanskill-Stringtown).

**DIDYMOGRAPTUS TENUIS** Ruedemann. See *Didymograptus subtenuis*.

**DIDYMOGRAPTUS (GONIOGRAPTUS) THUREAUI** McCoy. See *Goniograptus thureaui*.

**Didymograptus tornquisti** Ruedemann.

- Didymograptus tornquisti* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 688, pl. 13, figs. 6, 7.  
 Canadian (Deepkill, *Didymograptus bifidus* zone): Deepkill, Rensselaer County, New York.

**DIDYMOPORA** Ulrich. See *Fistulipora* McCoy.

**DIKELOCEPHALUS** Owen.

Genotype: *D. minnesotensis* Owen.

- Dikelocephalus* Owen, Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, p. 573.—Billings, Canadian Nat. Geol., 5, 1860, p. 306.—Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, p. 137.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 399.—Chapman, Expos. Min., Geol. Canada, 1864, p. 137.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 303.—Hall, Trans. Albany Inst., 5, 1867, p. 116.—Hall and Whitfield, U. S. Geol. Surv. Expl. 40th Parl., 4, 1877, p. 225.—Salter, Mem. Geol. Surv. Great Britain, 3, 2d ed., 1881, p. 497.—Whitfield, Geol. Wisconsin, 4, 1882, p. 200.—Zittel, Handb. Pal., 2, 1885, p. 596.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 192; Zittel-Eastman Textb. Pal., 1, 1900, p. 629.—Raymond, *ibid.*, 2d ed., 1913, p. 720.  
*Dikellocephalus* Dames, Richthofen's China, Berlin, 4, 1883, p. 5.—Koken, Die Leitfossilien, Leipzig, 1896, p. 17, fig. 10, fig. 8.  
*Dicelocephalus* Barrande, N. Jahrb. f. Min., 1853, p. 336.  
*Dicellocephalus* Whitfield, Ann. Rep. Wisconsin Geol. Surv., 1878, p. 63.—Miller, N. A. Geol. Pal., 1889, p. 543.—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 10.—Berkey, Amer. Geol., 21, 1898, p. 290.

**DIKELOCEPHALUS AFFINIS** Billings. See *Platycolpus affinis*.

**DIKELOCEPHALUS BARABUENSIS** Whitfield. See *Platycolpus barabuensis*.

**DIKELOCEPHALUS BELLII** Billings. See *Anomocarella belli*.

**DIKELOCEPHALUS CORAX** Billings. See *Apatokephalus corax*.

**DIKELOCEPHALUS CRISTATUS** Billings. See *Conokephalina? cristatus*.

**DIKELOCEPHALUS DEVINEI** Billings. See *Ptychoparia? devinei*.

**DIKELOCEPHALUS EATONI** Whitfield. See *Platycolpus eatoni*.

**DIKELOCEPHALUS HARTII** Walcott (1909). See *Saukia stosei*.

**Dikelocephalus hartti** (Walcott).

*Conocephalites* Hartti Walcott, 32d Rep. New York State Mus. Nat. Hist., 1880, p. 130.

*Dicelloccephalus hartti* Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 21.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 199, figs.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 273, pl. 44, figs. 1–7a.

*Dikelocephalus hartti* Walcott, Smiths. Misc. Coll., 57, No. 13, 1914, p. 368, pl. 63, figs. 1–7, 7a.

Ozarkian or Upper Cambrian: Near Saratoga Springs (Hoyt), and near Cha-teaugay, New York (top of Potsdam).

*Cotypes*.—Cat. Nos. 58571–58577, U.S.N.M.

**DIKELOCEPHALUS HISINGERI** Billings. See *Lisania? hisingeri*.

**DIKELOCEPHALUS MAGNIFICUS** Billings. See *Hungaia magnifica*.

**DIKELOCEPHALUS MEGALOPS** Billings. See *Conocephalina megalops*.

**Dikelocephalus? missisquoi** Billings.

*Dikelocephalus missisquoi* Billings, Pal. Foss., Geol. Surv. Canada, 1865, p. 199. Canadian (Beekmantown): Philipsburg, Quebec.

**DIKELOCEPHALUS NEWTONENSIS** Weller. See *Calvinella newtonensis*.

**DIKELOCEPHALUS OWENI** Billings. See *Anomocarella? oweni*.

**DIKELOCEPHALUS PAUPER** Billings. See *Ptychoparia? pauper*.

**DIKELOCEPHALUS PLANIFRONS** Billings. See *Anomocarella? planifrons*.

**DIKELOCEPHALUS SELECTUS** Billings. See *Ptychaspis? selectus*.

**DIKELOCEPHALUS SESOSTRIS** Billings. See *Ptychaspis sesostris*.

**Dikelocephalus tribulis** (Walcott).

*Dicelloccephalus tribulis* Walcott, Smiths. Misc. Coll., 57, 1912, p. 274, pl. 44, figs. 8, 8a.

*Dikelocephalus tribulis* Walcott, Smiths. Misc. Coll., 57, 1914, p. 372, pl. 63, figs. 8–10, 10a.

Ozarkian or Upper Cambrian (Hoyt): Near Saratoga Springs, New York.

*Holotype*.—Cat. No. 58578, U.S.N.M.

**Dilobella** Ulrich.

Genotype: *D. typa* Ulrich.

*Dilobella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 672.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 347.

**Dilobella typa** Ulrich.

*Dilobella typa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 673, pl. 46, figs. 30–34.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 348, fig. 1658s, s', t.—

Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425p.

*Bollia typa* Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.).

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 41641, U.S.N.M.

**DIMEROCRINITES** Phillips. See *Dimerocrinus Phillips*.



**DIMEROCRINUS** Phillips.Genotype: *D. decadactylus* Phillips.

*Dimerocrinites* Phillips, in Murchison's *Sil. Syst.*, 1839, p. 674.—Muller, *Monatsber. Berl. Akad.*, 1, 1841, p. 208.

*Dimerocrinus* D'Orbigny, *Prodr. Pal.*, 1, 1850, p. 46; *Cours elem. Pal.*, 2, p. 142.—Roemer, *Leth. geog.*, 1855, p. 237.—Salter, *Cat. Camb. Sil. Foss.*, 1873, p. 120.—Zittel, *Handb. Pal.*, 1, 1879, p. 368.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, pp. 358, 371, 405 (*Rev. Pal. pt. 2*, pp. 184, 197, 231); *ibid.*, 1885, p. 323.—Carpenter, *Phil. Trans. Royal Soc. London*, 174, 1884, p. 928.—Bather, *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 198.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 161.—Springer, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 187.

*Thysanocrinus* Hall, *Pal. New York*, 2, 1852, pp. 188, 355.—Pictet, *Traité de Pal.*, 2d ed., 4, 1857, p. 317.—Billings, *Geol. Surv. Canada, Rep. Progr. for 1853-56*, 1857, p. 262.—Hall, 15th Rep. New York State Cab. Nat. Hist. for 1861, 1862, p. 125.—Dujardin and Hupe, *Hist. Nat. des Zoophytes*, 1862, pp. 128, 131.—Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1866, p. 398.—Zittel, *Handb. Pal.*, 1, 1879, p. 377.—Carpenter, *Phil. Trans. Royal Soc. London*, 174, p. 928.—Miller, *N. A. Geol. Pal.*, 1889, p. 286.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool.*, Harvard, 20, 1897, p. 190.—Wachsmuth, *Zittel-Eastman Textb. Pal.* 1, 1900, p. 145.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 70, fig. 36.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 155; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 155.—Slocum, *Field Columbia Mus.*, 2, No. 10, *Geol. Ser.*, 1908, p. 299.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 547. (Genotype: *T. liliiformis* Hall.)

*Eucrinus* Angelin, *Icon. Crin.*, 1878, p. 24, pl. 6, figs. 8, 8a.—Zittel, *Handb. Pal.*, 1, 1879, p. 375.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, pp. 358, 370 (*Rev. Pal.*, pt. 2, pp. 184, 196); *ibid.*, 1885, p. 323.—Ringueberg, *Ann. New York Acad. Sci.*, 5, 1890, p. 305.—Bather, *Treatise on Zool.* (Lankester), pt. 3, 1900, p. 199.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 161. (Genotype: *E. lævis* Angelin.)

*Glyptaster* Hall, *Pal. New York*, 2, 1852, p. 187; *Trans. Albany Inst.*, 4, 1863, p. 202.—Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1866, p. 373.—Hall, 28th Rep. New York State Mus. Nat. Hist., *Mus. ed.*, 1879, p. 131.—Zittel, *Handb. Pal.*, 1, 1879, p. 375.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, pp. 358, 367 (*Rev. Pal.*, pt. 3, pp. 184, 193).—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 259.—Miller, *N. A. Geol. Pal.*, 1889, p. 247.—Bather, *Treatise on Zool.* (Lankester), pt. 3, 1900, p. 198.—Zittel, *Grundzuge Pal.*, 1910, p. 161. (Genotype: *G. brachiatus* Hall.)

***Dimerocrinus aculeatus* (Hall).**

*Thysanocrinus aculeatus* Hall, *Pal. New York*, 2, 1852, p. 190, pl. 42, figs. 3a-d.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 317, pl. 100, fig. 13.

*Rhodocrinus* (*Thysanocrinus*) *aculeatus* Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1866, p. 398.

Clinton (Rochester): Lockport, New York.

***Dimerocrinus arborescens* (Talbot).**

*Thysanocrinus arborescens* Talbot, *Amer. Jour. Sci.*, 20, 1905, p. 23, pl. 1, fig. 2; text fig. 1.

Helderbergian (Manlius transition beds, or Coeymans): North Litchfield, New York.

***Dimerocrinus brachiatus* (Hall).**

*Glyptaster brachiatus* Hall, Pal. New York, 2, 1852, p. 187, pl. 41, figs. 4a, b.

*Thysanocrinus brachiatus* Wachsmuth and Springer, Mem. Mus. Comp. Zool.

Harvard, 20, 1897, p. 195, pl. 18, fig. 7.

Clinton (Rochester): Lockport, New York.

***Dimerocrinus campanulatus* (Slocum).**

*Thysanocrinus campanulatus* Slocum, Field Columbian Mus., Geol., ed. ser., 10, 1908, p. 299, pl. 85, figs. 20, 23.

Niagaran (Racine): Drainage Canal, near Lemont, Illinois.

***Dimerocrinus canaliculatus* (Hall).**

*Thysanocrinus canaliculatus* Hall, Pal. New York, 2, 1852, p. 189, pl. 42, figs. 2a-d.

*Rhodocrinus* (*Thysanocrinus*) *canaliculatus* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 398.

Clinton (Rochester): Lockport, New York.

***Dimerocrinus egani* (Miller).**

*Glyptaster egani* Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 261, pl. 6, figs. 4, 4a, 4b; N. A. Geol. Pal., 1889, p. 247, fig. 311.

*Thysanocrinus egani* Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 74, pl. 1, fig. 5.

Niagaran (Racine): Bridgeport, Illinois.

***Dimerocrinus halli* (Lyon).**

*Rhodocrinus Halli* Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 412, pl. 4, fig. 5a, b.

*Thysanocrinus Halli* Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 196, pl. 13, fig. 9a, b.

Niagaran (Louisville): Near Louisville, Kentucky.

*DIMEROCRINUS IMMATURUS* Wachsmuth and Springer. See *Gazacrinus immaturus*.

***Dimerocrinus inornatus* (Hall).**

*Glyptaster inornatus* Hall, Trans. Albany Inst., 4, 1863, p. 205; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 207, fig. 3; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 14, figs. 1-6; Mus. ed., 1879, p. 134, pl. 14, figs. 1-6; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 261, fig. 3; also p. 263, pl. 13, figs. 1-6.

*Thysanocrinus inornatus* Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 193, pl. 18, figs. 6a-d; pl. 19, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 11, 1910, p. 547.

Niagaran: Waldron and Hartsville, Indiana; Newson, Tennessee (Waldron); ?Racine, Wisconsin (Racine).

***Dimerocrinus liliiformis* (Hall).**

*Thysanocrinus liliiformis* Hall, Pal. New York, 2, 1852, p. 188, pl. 42, figs. 1a-f.—Grabau, Bull. New York State Mus., 45, 1901, p. 156, fig. 50; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 156, fig. 50.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 199, pl. 18, fig. 4.

*Rhodocrinus* (*Thysanocrinus*) *liliiformis* Shumard, Trans. Acad. Sci. St. Louis (Cat., Pal. Foss.) 2, 1866, p. 398.

*Dimerocrinus liliiformis* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 373. (Rev. Pal., pt. 2, p. 199.)

Clinton (Rochester): Lockport, New York.



***Dimerocrinus lockportensis* (Ringueberg).**

*Glyptaster* (*Eucrinus*) *lockportensis* Ringueberg, *Annals New York Acad. Sci.*, 5, 1890, p. 304, pl. 3, fig. 4.

Niagaran (Lockport, Gasport member): Lockport, New York.

***Dimerocrinus milliganæ* (Miller and Gurley).**

*Glyptaster milliganæ* Miller and Gurley, *Bull., Illinois State Mus. Nat. Hist.*, 10, 1896, p. 87, pl. 5, figs. 7-9.

Niagaran (Brownsport): Decatur County, Tennessee.

***Dimerocrinus occidentalis* (Hall).**

*Glyptaster occidentalis* Hall, *Trans. Albany Inst.*, 4, 1863, p. 204 (abstract, p. 10); 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1865), p. 326, pl. 10 (1), fig. 3; rev. ed., 1870, p. 369, pl. 10, fig. 3; 20th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 13, figs. 7-11; Mus. ed., 1879, p. 133, pl. 13, figs. 7-11.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, p. 370 (Rev. Pal. pt. 2, p. 196).—Hall, 11th Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 262, pl. 12, figs. 7-11.—Whitfield, *Geol. Wisconsin*, 4, 1882, p. 281, pl. 16, figs. 3, 4.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 191, fig.—Miller, *N. A. Geol. Pal.*, 1889, p. 247, fig. 312.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool. Harvard*, 20, 1897, p. 194, pl. 18, fig. 5a-c.

*Thysanocrinus occidentalis* Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 73, pl. 1, figs. 6, 7.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 547.

*Glyptaster occidentalis* var. *crebescens* Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 133; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 263.

Niagaran: Waldron and Hartsville, Indiana (Waldron); Racine, Wisconsin; Bridgeport and Hawthorne, Illinois (Racine).

***Dimerocrinus pentangularis* (Hall).**

*Glyptaster pentangularis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 326, pl. 10 (1), fig. 4 (extras, 1865); *ibid.*, rev. ed., 1870, p. 369, pl. 10, fig. 4.

*Thysanocrinus pentangularis* Weller, *Bull. Chicago Acad. Sci. Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 70, pl. 1, figs. 8-11.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 547.

Niagaran (Racine): Racine, Wisconsin; Bridgeport and Hawthorne, Illinois.

***Dimerocrinus roemeri* (Troost).**

*Gilbertsocrinites roemeri* Troost MS., 1850.

*Dimerocrinus roemeri* (Troost) Wood, *Bull. U. S. Nat. Mus.*, 64, 1909, p. 101, pl. 15, fig. 4.

Niagaran (Brownsport): Decatur and Perry Counties, Tennessee.

*Holotype*.—Cat. No. 39968, U.S.N.M.

***Dimerocrinus waldronensis* (Miller and Dyer).**

*Cyathocrinus waldronensis* Miller and Dyer, *Cont. to Pal.*, 2, 1878, p. 6, pl. 4, fig. 9.—Miller and Gurley, *Bull. Illinois State Mus. Nat. Hist.*, 1896, p. 49, pl. 3, figs. 19, 20.—Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 741, fig. 1330.

*Dimerocrinus waldronensis* Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1885, p. 323 (Rev. Pal., pt. 3, sec. 1, p. 101).

*Macrostylocrinus waldronensis* Wachsmuth and Springer, *ibid.*, 1886, p. 149 (Rev. Pal., pt. 3, sec. 2, p. 225).

Niagaran (Waldron): Waldron, Indiana.

**DIMORPHOGRAPTUS** Lapworth.Genotype: *D. elongatus* Lapworth.

*Dimorphograptus* Lapworth, *Geol. Mag.*, dec. 2, 3, 1876, p. 545.—Elles and Wood, *Mon. British Grapt.*, 8, 1911, p. 348.

**Dimorphograptus decussatus** Elles and Wood.

*Dimorphograptus decussatus* Elles and Wood, *Mon. British Grapt.*, 8, 1911, p. 352, pl. 35, figs. 5a-e.

Silurian: Scotland (Llandovery-Birkhill); Blaylock Mountain, Montgomery County, Arkansas (Blaylock) [Ulrich].

**DINOBOULUS** Hall.Genotype: *Obolus conradi* Hall.

*Dinobolus* Hall, Notes on Some New or Imperfectly Known Forms among the Brach., (March) 1871, p. 4; *ibid.*, 1872, p. 4.—Davidson and King, *Geol. Mag.*, 9, p. 442; *Ann. Mag. Nat. Hist.*, 4th ser., 10, p. 248.—Hall, 23d Rep. New York State Cab. Nat. Hist., 1873, p. 247.—Hall and Whitfield, *Pal. Ohio*, 2, 1873, p. 130.—Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 159.—Zittel, *Handb. Pal.*, 1, 1880, p. 668.—Miller, *N. A. Geol. Pal.*, 1889, p. 343.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 36, 46, 164; 11th Ann. Rep. New York State Geol., 1894, p. 237.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 231, fig. 190, 2.—Schuchert, *Zittel-Eastman Pal.*, 1, 1900, p. 306, 2d ed., 1913, p. 373.—Grabau and Shimer, *North Amer. Index Fossils*, 1, 1907, p. 190.

*Obolellina* Billings, *Canadian Nat. Geol.*, 6, 1871, p. 222; *ibid.*, 6, 1872, p. 326, figs. 1, 2; *Amer. Jour. Sci.*, 3d ser., 3, 1872, p. 270.

*Conradia* Hall (not Adams), 23d Rep. New York State Cab. Nat. Hist., 1873, p. 250.—Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 159.

**Dinobolus canadensis** (Billings).

*Obolus canadensis* Billings, *Canadian Nat. Geol.*, 3, 1858, p. 441, fig. 20-23 (not fig. 19=*D. magnificus*); *Geol. Surv. Canada*; *Rep. Prog. for 1857*, 1858, p. 189, figs. 20-23 (not fig. 19); *Geol. Canada*, 1863, p. 142, figs. 75.

*Obolellina canadensis* Billings, *Canadian Nat. Geol.*, 6, 1871, p. 222; *ibid.*, 1872, p. 326, fig. 15; fig. 6, p. 329.

*Dinobolus canadensis* Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 162, pl. 19, fig. 7.

Black River (Leray): Pauquette's Rapids, etc., Canada.

**Dinobolus conradi** (Hall).

*Obolus conradi* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 368, pl. 13, figs. 1, 2.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 192, fig.

*Obolus* (*Trimerella*?) *conradi* Meek and Worthen, *Geol. Surv. Illinois*, 3, 1868, p. 351, pl. 5, fig. 7.

*Trimerella conradi* Dall, *American Jour. Conch.*, 7, 1871, p. 83.

*Dinobolus conradi* Hall, 23d Rep. New York State Cab. Nat. Hist., 1873, p. 247 (also extracts 1871, 1872).—Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 160, pl. 18, figs. 1-5.—Hall and Whitfield, *Pal. Ohio*, 2, 1875, p. 130, pl. 7, figs. 3, 4.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, p. 38, pl. 4B, figs. 13-24.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 428, pl. 1, fig. 8.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 190, fig. 255a.

Niagaran: Port Byron, Illinois; Leclaire, Iowa; Racine and Grafton, Wisconsin (Racine); Crawford, Ohio; England; Gotland.

*Plesiotype*.—Cat. No. 52938, U.S.N.M.



**Dinobolus magnificus** (Billings).

*Obolus canadensis* Billings (part), Geol. Surv. Canada, Rep. Prog. for 1857, 1858, p. 189, fig. 19 (not 20-23); Canadian Nat. Geol., 3, 1858, p. 441, fig. 19 (not figs. 20-23=D. canadensis).

*Obolellina magnificus* Billings, *ibid.*, n. ser., 6, 1872, p. 329, fig. 7.

*Dinobolus magnificus* Davidson and King, Quart. Jour. Geol. Soc. London, 30, 1874, p. 164, pl. 19, fig. 8.—Nicholson, Pal. Prov. Ontario, 1875, p. 17, fig. 6.

Black River (Leray): Pauquette's Rapids, etc., Canada.

**Dinobolus(?) parvus** Whitfield.

*Dinobolus?* parvus Whitfield, Geol. Wisconsin, 4, 1882, p. 347, pl. 27, figs. 8-10.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 356, fig. 27.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 166.

Trenton: Whitewater, Wisconsin; Wykoff, Minnesota (Prosser); Lake Winnipeg, Canada.

*Plastotype*.—Cat. No. 45548, U.S.N.M.

**DINORTHIS** Hall and Clarke.

Genotype: *Orthis pectinella* Emmons.

*Dinorthis* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 195-222.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 420.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 266.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 252.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 888.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 382.

*Plæsiomys* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 196; 11th Ann. Rep. New York State Geol., 1894, p. 266.—Schuchert, Zittel Textb. Pal., 1913, p. 382. (Genotype: *Orthis subquadrata* Hall.)

*Valcourea* (subgenus of *Plæsiomys*) Raymond, Ann. Carnegie Mus., 7, 1911, p. 239. (Genotype: *Plæsiomys strophomenoides* Raymond.)

**Dinorthis carleyi** (Hall).

*Orthis retrorsa* Billings (not Salter), Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 136, fig. 113 (adv. sheets, 1862) (not fig. 112=D. retrorsa).—Meek, Pal. Ohio, 1, 1873, p. 92, pl. 11, fig. 7.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 37.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 532, figs.—McCreery, Amer. Geol. 5, 1890, p. 102.

*Plæsiomys retrorsa* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 197, 222; pl. 5A, figs. 14-16.

*Dinorthis retrorsa* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 902, pl. 33, figs. 7-7d.—Foerste, Amer. Geol., 31, 1903, p. 335 (loc. occ.).

*Orthis carleyi* Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 120, fig.; 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 28, 29.

*Dinorthis carleyi* Foerste, Ohio Nat., 12, No. 3, 1912, p. 453, pl. 22, fig. 8.

*Orthis kennicotti* McChesney, New Pal. Fossils, 1861, p. 78.

Richmond (Arnheim): Oxford, etc., Ohio; Indiana; Kentucky; Tennessee.

**Dinorthis carleyi insolens** Foerste.

*Dinorthis carleyi-insolens* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 320, pl. 7, fig. 9.

Richmond (Waynesville): Miltonville, etc., Ohio; Indiana.

**Dinorthis (Valcourea) deflecta** (Conrad).

*Strophomena deflecta* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 332.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 198.

**Dinorthis (Valcourea) deflecta**—Continued.

- Strophomena recta* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 332.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 199.
- Leptaena deflecta* Hall, Pal. New York, 1, 1847, p. 113, pl. 31B, fig. 5.
- Leptaena recta* Hall, *ibid.*, 1847, p. 113, pl. 31B, fig. 6.
- Streptorhynchus rectus* Miller, Amer. Pal. Foss., 1877, p. 134.
- Streptorhynchus deflectum* Miller, N. A. Geol. Pal., 1889, p. 378.
- Plæsiomys deflecta* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 197, 222, pl. 5A, figs. 28–34.
- Plæsiomys recta* Hall and Clarke, *ibid.*, 1892, pp. 197, 222.
- Plæsiomys loricula* Hall and Clarke, *ibid.*, 1892, pp. 197, 341, pl. 5A, figs. 31–34.
- Orthis (Dinorthis) deflecta* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 422, pl. 32, figs. 24–30.
- Orthis (Plæsiomys) loricula* Hall and Clarke, 48th Rep. New York State Mus., 2, for 1895, 1897, p. 339, pl. 4, figs. 7–9; 14th Rep. State Geol. New York for 1894, 1897, p. 339, pl. 4, figs. 7–9.
- Dinorthis deflecta* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 252, fig. 303a–d.
- Black River: Mineral Point, Beloit, Janesville, Wisconsin; Dixon, Illinois; Minneapolis, St. Paul, etc., Minnesota; McGregor, Iowa; central Tennessee; Highbridge, Kentucky.
- Stone River: Central Tennessee.

**Dinorthis fontinalis** (White).

- Strophomena fontinalis* White, Wheeler's Expl. and Surv. West 100th Merid., 4, 1875, p. 54, pl. 3, fig. 4; Prelim. Rep., p. 10, 1874.
- Dinorthis fontinalis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 215.
- Middle Ordovician: Fish Spring, House Range, Utah.
- Cotypes*.—Cat. No. 17223, U.S.N.M.

**Dinorthis (Plæsiomys) iphigenia** (Billings).

- Orthis iphigenia* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 133, pl. 110 (adv. sheets, 1862).
- Plæsiomys iphigenia* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.
- Dinorthis iphigenia* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 215.
- Trenton: Ottawa, Ontario.

**Dinorthis meedsi** (Winchell and Schuchert).

- Orthis meedsi* Winchell and Schuchert, Amer. Geol., 9, April 1, 1892, p. 289.
- Orthis minnesotensis* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, April 9, 1892, p. 332, pl. 5, figs. 14–17.
- Orthis (Dinorthis) meedsi* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 427, pl. 32, figs. 39–42.
- Dinorthis meedsi* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 253, fig. 303e–h.
- Trenton (Prosser): Cannon Falls, Kenyon, Preston, etc., Minnesota; Decorah and McGregor, Iowa; Neenah and Oshkosh, Wisconsin.

**Dinorthis meedsi arctica** (Schuchert).

- Orthis (Dinorthis) meedsi* var. *arctica* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 157, pl. 12, figs. 7, 8.
- Mohawkian: Head of Frobisher Bay, Baffin Land.
- Cotypes*.—Cat. No. 28152, U.S.N.M.



***Dinorthis meedsi germana* (Winchell and Schuchert).**

*Orthis meedsi* var. *germana* Winchell and Schuchert, Amer. Geol., 9, 1892, p. 290.

*Orthis* (*Dinorthis*) *meedsi* var. *germana* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 428, pl. 32, figs. 43-45.

*Dinorthis meedsi germana* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 215.

Trenton (Prosser): Cannon Falls, Kenyon, and Fountain, Minnesota.

***Dinorthis pectinella* (Emmons).**

*Orthis pectinella* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 394, fig. 2.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 366, fig. 2.—Hall, Pal. New York, 1, 1847, p. 123, pl. 32, fig. 10.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 193, pl. 9, figs. 10, 11, a, b.—Billings, Can. Nat. Geol., 1, 1857, p. 205, fig. 5.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 818, fig. 602.—Emmons, Manual Geology, 1860, p. 99, fig. 88.—Billings, Geol. Canada, 1863, p. 165, fig. 147.—Hitchcock, Geol. Vermont, 1, 1862, p. 294, fig. 202.—Chapman, Canadian Jour., n. s., 7, 1862, p. 111, fig. 92; *ibid.*, 8, 1863, p. 199, fig. 184; Expos. Min., Geol. Canada, 1864, p. 115, fig. 91; p. 171, fig. 183.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 155, fig.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 39, 40.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 527, figs.

*Orthis pectinella* var. *semiovalis* Hall, Pal. New York, 1, 1847, p. 124, pl. 32, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 359.

*Dinorthis pectinella* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 195, 222, 228, pl. 5, figs. 27-33.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 154, pl. 9, figs. 29, 30.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 253, fig. 303i-1.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 24, fig. 2.

*Orthis* (*Dinorthis*) *pectinella* Winchell and Schuchert, Minnesota Geol. Survey, 3, 1893, p. 424, pl. 32, figs. 31-34.—Whiteaves, Pal. Fossils, 3, pt. 3, 1897, p. 175.

*Orthis charlotte* Winchell, 8th Rep. Geol. Nat. Hist. Surv. Minnesota, 1880, p. 67. Upper Black River and Early Trenton: Middleville, Trenton Falls, etc., New York; Pennsylvania; Mercer County, Kentucky; Ontario; Decorah, Iowa; St. Paul, Minneapolis, and Cannon Falls, Minnesota; Lake Winnipeg, Canada; Tennessee; Virginia.

***Dinorthis pectinella sweeneyi* (N. H. Winchell).**

*Orthis sweeneyi* N. H. Winchell, 9th Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 117.

*Dinorthis sweeneyi* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 196, 222, 228, pl. 5, figs. 34-36.

*Orthis* (*Dinorthis*) *pectinella* var. *sweeneyi* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 426, pl. 32, figs. 35-38.

Black River (Decorah): St. Paul, Cannon Falls, etc., Minnesota; Decorah and McGregor, Iowa.

***Dinorthis* (*Plæsiomys*) *platys* (Billings).**

*Orthis platys* Billings, Canadian Nat. Geol., 4, 1859, p. 438, fig. 15; Geol. Canada, 1863, p. 129, fig. 54.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 218.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1893, p. 424.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 530, figs.

*Dinorthis platys* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 216.

*Plæsiomys platys* Raymond, Ann. Carnegie Mus., 7, 1911, p. 238, pl. 35, figs. 13-14. Chazy: Montreal, Quebec; Crown Point, Valcour Island, and Chazy, New York (Crown Point); East Tennessee (Lenoir).

**DINORTHIS PORCATA** Schuchert (part). See *Dinorthis* (*Plæsiomys*) *porcata antiochiensis*.

***Dinorthis* (*Plæsiomys*) *porcata antiochiensis* (Shaler).**

*Orthis porcata* Billings (not McCoy), Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 135, fig. 111 (adv. sheets); Geol. Canada, 1863, p. 312, fig. 319.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 531, figs.

*Plæsiomys porcata* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 197, 22, pl. 5A, figs. 20, 21.

*Dinorthis porcata* Schuchert (part), Bull. U. S. Geol. Surv., 87, 1897, p. 216.

*Orthis antiochiensis* Shaler, Fossil Brach. of the Ohio Valley, 1887, p. 19, pl. 6. Richmond: English Head, etc., *Antiochi* (Ellis Bay); Stony Mountain, Manitoba Stony Mountain).

***Dinorthis proavita* (Winchell and Schuchert).**

*Orthis proavita* Winchell and Schuchert, Amer. Geol., 9, April 1, 1892, p. 290.

*Orthis petrae* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, April 9, 1892, p. 332, pl. 5, figs. 18–21.

*Orthis* (*Dinorthis*) *proavita* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 431, pl. 32, figs. 51–57.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 120.—?Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 176.

*Dinorthis proavita* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 216.

Richmond: Spring Valley, Minnesota; Wilmington, Illinois; Lake Winnipeg, Manitoba; Texas; etc.

***Dinorthis* (*Plæsiomys*) *retrorsa* (Salter).**

*Orthis retrorsa* Salter, Mem. Geol. Surv. Great Britain, 2, 1858, p. 373, pl. 27, figs. 3, 4.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 136, fig. 112 (not 113=*D. carleyi*) (adv. sheets, 1862).

*Plæsiomys retrorsa* Ruedemann, Bull. New York State Mus., 162, 1912, p. 93, pl. 4, figs. 9–12.

Middle Ordovician: Wales (Bala); Snake Hill, Saratoga County, New York, and Ottawa, Ontario (Trenton).

**DINORTHIS RETRORSA** Cumings. See *Dinorthis carleyi*.

**DINORTHIS SCOVILLEI** Foerste. See *Plectorthis* (*Austinella*) *scovillei*.

***Dinorthis* (*Valcourea*) *strophomenoides* (Raymond).**

*Plæsiomys strophomenoides* Raymond, Amer. Jour. Sci., 4th ser., 20, p. 370.

*Valcourea strophomenoides* Raymond, Ann. Carnegie Mus., 7, 1911, p. 240, pl. 35, figs. 15–19; pl. 36, fig. 1, text fig. 12.

Chazyan: Valcour Island and Plattsburg, New York (Crown Point); East Tennessee (Lenoir).

***Dinorthis* (*Plæsiomys*) *subquadrata* (Hall).**

*Orthis subquadrata* Hall, Pal. New York, 1, 1847, p. 126, pl. 32A, fig. 1; Geol. Wisconsin, 1, 1862, p. 54, figs. 1, 2.—Meek, Pal. Ohio, 1, 1873, p. 94, pl. 9, fig. 2.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 38.—White, 2d Ann. Rep. Indiana Bureau Stat. Geol., 1880, p. 484, pl. 1, figs. 3–5; 10th Rep. State Geol. Indiana, 1881, p. 116, pl. 1, figs. 3–5.—Shaler, Foss. Brach. of the Ohio Valley, 1876, p. 22, pl. 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 535, figs.—Keyes, Geol. Surv. Missouri, 5, 1895, p. 60.

?*Orthis subquadrata* Billings, Geol. Canada, 1863, p. 165, fig. 146.

*Platystrophia subquadrata* Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, p. 75, pl. 3, fig. 4.



**Dinorthis (Plæsiomys) subquadrata**—Continued.

*Plæsiomys subquadrata* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 194, 196, 222, pl. 5A, figs. 17–19.

*Orthis* (*Dinorthis*) *subquadrata* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 428, pl. 32, figs. 46–50.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 176.

*Dinorthis subquadrata* Hayes and Ulrich, U. S. Geol. Surv., folio 95, 1903, illus. sheet, figs. 7, 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 254, fig. 303m–o.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 904, pl. 34, figs. 1–1b.

Richmond: Ohio Valley; Spring Valley, Minnesota; Wilmington, Illinois; Warren and Jefferson Counties, Missouri; Lattners, Iowa; Iron Ridge, Wisconsin; Lake Winnipeg, Canada; Anticosti; Texas; etc.

*Plesiotypes*.—Cat. No. 35454, U.S.N.M. (Hayes and Ulrich).

**DINORTHIS SWEENEYI** Hall and Clarke. See *Dinorthis pectinella sweeneyi*.

**Dinorthis (Plæsiomys) ulrichi** Foerste.

*Dinorthis ulrichi* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 320, pl. 7, fig. 7a–c.

Trenton (Flanagan): Near Becknerville, Clark County, Flanagan and Paris, Kentucky.

**DIONE** Barrande. See *Dionide* Barrande.

**DIONIDE** Barrande.

Genotype: *Dione formosa* Barrande.

*Dione* Barrande, Note Prelim. Sil. Syst. Boheme, 1846, p. 32.

*Dionide* Barrande, Neues Jahrb. f. Min., pt. 4, 1847, p. 391, footnote; Syst. Sil. du Centre Boheme, 1, 1852, p. 640.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 510.—Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 50.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 289.—Zittel, Handb. Pal., 2, 1885, p. 594.—Miller, N. A. Geol. Pal., 1889, p. 544.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15, text fig. 9, fig. 2.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 184, 186.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 32.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 510.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 711.

*Polytomurus* Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 37, pl. 3, fig. 16.—Angelin, Pal. Scandinavica, 3d ed., Holmia, 1878, p. 12.

**Dionide(?) perplexa** Billings.

*Dionide? perplexa* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 67.

Anticostian (Jupiter River): The Jumpers, Anticosti.

**DIORYCHOPORA** Davis.

Genotype: *D. tenuis* Davis.

*Diorychopora* Davis, Kentucky, Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, expl. of pl. 74.

**Diorychopora tenuis** Davis.

*Diorychopora tenuis* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 74, fig. 6.

Niagaran (Louisville): Near Louisville, Kentucky.

**DIPHYPHYLLUM** Lonsdale.

Genotype: *D. concinnum* Lonsdale.

*Diphyphyllum* Lonsdale, Murchison's Geol. Russia in Europe, 1, 1845, p. 622.—McCoy, British Pal. Rocks Foss., 1854, p. 87.—Billings, Canadian Jour., n. s., 4, 1859, p. 133.—Dybowski, Archiv. f. Naturf. Liv-, Ehst. und. Kurl., 5, 1874, p. 337.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 31.—

**DIPHYPHYLLUM**—Continued.

Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 120.—Lindström, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 15.—Thomson and Nicholson, Ann. Mag. Nat. Hist., ser. 4, 17, 1876, p. 123.—Zittel, Handb. Pal., 1, 1879, p. 231.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 357.—Frech, Pal. Abhandl., Dames and Kayser, 3, Heft 3, 1886, p. 94.—Miller, N. A. Geol. Pal., 1889, p. 186.—Sherzer, Amer. Geol., 7, 1891, pp. 290–295.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 157.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 25, 26.

*Diphyphyllum* Hall, Amer. Jour. Sci. and Arts., 2d ser., 11, 1851, p. 399; Pal. New York, 2, 1852, p. 115; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80.—Grabau, Bull. New York State Mus., 45, 1901, p. 139; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 139.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, pp. 25, 26.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 73. (Genotype: *D. caespitosum* Hall.)

***Diphyphyllum billingsi* Greene.**

*Diphyphyllum billingsi* Greene, Cont. Indiana Pal., 11, 1903, p. 98, pl. 31, figs. 2, 3.

Niagaran (Louisville): Louisville, Kentucky.

***Diphyphyllum caespitosum* (Hall).**

*Diphyphyllum caespitosum* Hall, Pal. New York, 2, 1852, p. 116, pl. 33, figs. 1a–r, 2.—Grabau, Bull. New York State Mus., 45, 1901, pp. 139–140, fig. 33; Bull. Buffalo Soc. Nat. Hist., 7, 1901, p. 139, fig. 33.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 25.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 74, fig. 117.

*Diphyphyllum caespitosum* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80 (gen. ref.).—Lambe, Ottawa Nat., 12, 1899, p. 240.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 343.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 158, pl. 13, figs. 3, 3a, 3b.

*Cyathophyllum pelagicum* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 108 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).

Silurian: Lockport, etc., New York; Ontario (Lockport); Wisconsin (Racine and Guelph); Island of Anticosti (Becsie River, Gun River); Ontario (Cataract).

***Diphyphyllum coralliferum* (Hall).**

*Diphyphyllum coralliferum* Hall, Pal. New York, 2, 1852, p. 322, pl. 72, figs. 1a–c.

*Diphyphyllum coralliferum* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80 (gen. ref.).—Schuchert, Amer. Geol., 31, 1903, p. 163. (loc. occ.)

Cayugan (Cobleskill): Schoharie, etc., New York.

***Diphyphyllum huronicum* Rominger.**

*Diphyphyllum Huronicum* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 121, pl. 45, fig. 1.

*Eridophyllum huronicum* Davis, Kentucky, Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 109, fig. 2; pl. 111.

Niagaran: Point Detour, Michigan; Drummond Island; Louisville, Kentucky.

***Diphyphyllum integumentum* (Barrett).**

*Diphyphyllum integumentum* Barrett, Ann. New York Acad. Sci., 1, 1878, p. 123.—Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 218, pl. 17, fig. 11.



**Diphyphyllum integumentum**—Continued.

*Diphyphyllum integumentum* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 106, pl. 10, fig. 1; pl. 15, fig. 9-10; pl. 16, figs. 15 and 17.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

Upper Monroan (Anderdon and Amherstburg); Detroit River area.

**Diphyphyllum? multicaule** (Hall).

*Syringopora? multicaulis* Hall, Pal. New York, 2, 1852, p. 119, pl. 33, fig. 3a-g.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 493, footnote.

*Diphyphyllum multicaule* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 122, pl. 45, figs. 3, 4.—Sherzer, Amer. Geol., 6, 1890, p. 61.—Lambe, Ottawa Nat., 12, 1899, p. 241; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 159, pl. 13, figs. 4, 4a-c.

*Synaptophyllum multicaule* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 105, pl., 12, fig. 6.

*Eridophyllum vennori* Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 430.

*Diphyphyllum vennori* Miller, N. A. Geol. Pal., 1889, p. 186 (gen. ref.).

Silurian: Lockport, etc., New York (Lockport); Michigan; Manitoulin Island, Lake Huron (Cataract).

Upper Monroan (Amherstburg): Detroit River, opposite Amherstburg, Ontario.

**Diphyphyllum proliferum** Foerste.

*Diphyphyllum proliferum* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 102, pl. 1, figs. 18A-d.

Niagaran (Brownsport): Near Linden; Brownsport Furnace and Savannah, Tennessee.

**DIPHYPHYLLUM RUGOSUM** Rominger. See *Eridophyllum rugosum*.

**DIPHYPHYLLUM STOKESI** Whiteaves. See *Columnaria* (*Palæophyllum*) *stokesi*.

**DIPHYPHYLLUM VENNORI** Miller. See *Diphyphyllum multicaule*.

**DIPLASPIS** Matthew. See *Cyathaspis* Lankester.

**DIPLEURA** Green. See *Homalonotus* Koenig.

**DIPLOCERAS** Conrad. See *Endoceras* Hall.

**DIPLOCLEMA** Ulrich.

Genotype: *D. trentonense* Ulrich.

*Diploclema* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 368; (Ulrich, in press), Miller, N. A. Geol. Pal., 1889, p. 300.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 262.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 1, 1894, p. 17.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 22.—Grabau, Bull. New York State Mus., 45, 1901, p. 162; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 162.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 17; Zittel-Eastman Textb. Pal., 1913, p. 321.

**Diploclema sparsum** (Hall).

*Trematopora sparsa* Hall, Pal. New York, 2, 1852, p. 155, pl. 40A, figs. 12a-d.—*Diploclema sparsum* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 369, pl. 53, fig. 10.—Grabau, Bull. New York State Mus., 45, 1901, p. 162, fig. 57; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 162, fig. 57.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 17, pl. 5, figs. 6, 7; pl. 23, figs. 4-6.

Clinton (Rochester): Lockport, etc., New York; Grimsby and Hamilton, Ontario. Anticostian (Gun River-Jupiter River): Anticosti.

*Plesiotype*.—Cat. No. 44071, U.S.N.M.

**Diploclema sparsum argutum** Bassler.

*Diploclema sparsum* var. *argutum* Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 17, 18, pl. 5, figs. 8, 9.

Clinton (Rochester): Lockport, New York.

*Holotype*.—Cat. No. 35557, U.S.N.M.

**Diploclema trentonense** Ulrich.

*Diploclema trentonense* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 369, pl. 53, figs. 9–9c.

Trenton: Trenton Falls, New York.

*Cotypes*.—Cat. No. 43251, U.S.N.M.

**DIPLOGRAPSPUS AMPLEXICAULE** Emmons. See *Diplograptus* (*Glyptograptus*) *amplexicaulis*.

**DIPLOGRAPSPUS ANTENNARIUS** Nicholson. See *Cryptograptus antennarius*.

**DIPLOGRAPSPUS CILIATUS** Emmons. See *Glossograptus arthracanthus*.

**Diplograptus foliosus** Emmons. Undeterminable.

*Diplograptus foliosus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 106, pl. 1, fig. 13; Manual Geology, 1860, p. 87, fig. 68.

Mohawkian: Augusta County, Virginia.

**DIPLOGRAPSPUS HUDSONICUS** Nicholson. See *Diplograptus hudsonicus*.

**DIPLOGRAPSPUS LACINIATA** Emmons. See *Diplograptus foliaceus*.

**DIPLOGRAPSPUS MUCRONATUS** McCoy. See *Lasiograptus mucronatus*.

**DIPLOGRAPSPUS OBLIQUIS** Emmons. See *Diplograptus foliaceus*.

**Diplograptus stenosus** Gurley. Not recognized.

*Diplograptus stenosus* Gurley, Jour. Geol., 4, 1896, p. 78.

Trenton (Magog): Magog, Quebec.

**DIPLOGRAPSPUS WHITFIELDI** Nicholson. See *Glossograptus whitfieldi*.

**DIPLOGRAPTUS** McCoy. Genotype: *Graptolithus foliaceus* Murchison.

*Diplograptus* McCoy, Ann. Mag. Nat. Hist., 6, 1850, p. 270; British Pal. Rocks Foss., 1854, p. 3.—Geinitz, Amer. Jour. Sci. Arts, 2d ser., 14, 1852, p. 128; Bull. Soc. Geol. France, 2d ser., 9, 1852, p. 187; Zeits. d. d. geol. Gesell., 3, 1852, p. 389.—Richter, Zeits. d. d. geol. Gesell., 5, 1853, p. 455.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 104.—Chapman, Canadian Jour., n. s., 1, 1856, p. 389; 6, 1861, p. 506; Expos. Min. Geol. Canada, 1864, p. 100.—Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, pp. 9, 137; Mon. British Grapt., 1872, p. 115.

*Diplograptus* Dana, Amer. Jour. Sci. Arts, 2d ser., 14, 1852, p. 128.—Hall, Geol. Surv. Canada, dec. 2, 1865, p. 109; 20th Rep. New York State Cab. Nat. Hist., p. 217; rev. ed., 1868 (1870), p. 251.—Zittel, Handb. Pal., 1, 1879, p. 300.—Dairon, Trans. Geol. Soc. Glasgow, 7, 1883, p. 177.—Tullberg, Sveriges Geol. Unders., ser. C, no. 55, 1883, pp. 13, 14.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 561.—Miller, N. A. Geol. Pal., 1889, p. 186.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, p. 157.—Wiman, Jour. Geol., 2, 1894, p. 267.—Ruedemann, 48th Rep. New York State Mus., 2, 1897, p. 244; 14th Rep. State Geol. New York for 1894, 1897, p. 244.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, 1896, p. 264.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Wiman, Nat. Sci., 9, 1896, p. 188.—Roemer and Frech, Leth. geog.,



**DIPLOGRAPTUS**—Continued.

1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 624.—Walther, Zeits. d. d. geol. Gesell., 49, 1897, p. 250.—Ruedemann, Amer. Nat., 32, 1898, p. 3: Zittel-Eastman Textb. Pal., 1, 1900, p. 119.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. xxxii.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 718, 719.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 33.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 339-341; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 130.

Glyptograptus Zittel, Handb. Pal., 1, 1879, p. 300.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 264.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, pp. 625, 632.

**Diplograptus acutus** (Elles and Wood).

Diplograptus vulgatus var. acutus, Elles and Wood, Mon. British Grapt., pt. 6, 1907, p. 242, pl. 30, figs. 3a-c.

Ordovician: South Scotland (Glenkiln); Arkansas (Stringtown).

**DIPLOGRAPTUS AMPLEXICAULE** Walcott (part). See *Diplograptus peosta*.

**DIPLOGRAPTUS AMPLEXICAULE** Whitfield. See *Diplograptus amplexicaulis pertenuis*.

**Diplograptus (Glyptograptus) amplexicaulis** (Hall).

Graptolithus amplexicaule Hall, Pal. New York, 1, 1847, pp. 79, 316, pl. 26, figs. 11a, b.—Hitchcock, Geol. Vermont, 1, 1861, p. 291, text fig.; New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, pl. 3, figs. 6, 7, rev. ed., 1870, p. 223.

Diplograptus amplexicaule Emmons, Amer. Geology, 1, pt. 2, 1855, p. 236, pl. 7, figs. 11a, b.

Diplograptus amplexicaulis Lapworth, Proc. and Trans. Roy. Soc. Can., 1886, 4, p. 184.—White Trans. New York Acad. Sci., 15, 1895, p. 93.—Ruedemann, Bull. New York State Mus., 39, 1901, p. 497ff.

Diplograptus foliaceus mut. amplexicaule Gurley, Jour. Geol., 4, 1896, p. 298.

Diplograptus (Glyptograptus) amplexicaulis Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 632 (gen. ref.).—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 361-365, pl. 25, figs. 10-13, text figs. 302-307.

Trenton: Trenton Falls, Middleville, and Washington County, New York.

**Diplograptus amplexicaulis pertenuis** Ruedemann.

Diplograptus amplexicaule Whitfield, U. S. Geol. Sur. West 100th Merid., Wheeler's Rep., 4, Pal., 1877, p. 19.—Ruedemann, Bull. New York State Mus., 8, 1901, p. 533, footnote.

Diplograptus amplexicaulis var. pertenuis Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 365, 366, pl. 25, figs. 14-16, text figs. 308-310.

Trenton (Snake Hill): Lansingburg and Troy, New York.

**Diplograptus (Glyptograptus) angustifolius** (Hall).

Graptolithus angustifolius Hall, Pal. New York, 3, 1859, p. 515, figs. 1, 2; New York State Cab. Nat. Hist., 13th Ann. Rep., 1860, p. 59, figs. 1, 2.

Diplograptus angustifolius Nicholson, Geol. Soc. Lond. Quar. Jour., 1868, p. 525, pl. 19, figs. 8, 9.—Lapworth, Cat. West. Scott. Foss., 1876, pl. 2, fig. 35; Belfast Nat. Field Club., Rep. and Proc., App., 1, pt. 4, 1877, p. 132, pl. 6, fig. 11; Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 21.—Walcott, Alb. Inst. Trans., 10, 1881 (adv. sheets, 1879, p. 34).—Lapworth, Geol. Sur. Can. Rep., 2d ser., 2, 1886, p. 22D; Sci., 9, 1887, p. 320.—Ami, Geol. Sur. Can. Rep. 2d ser., 3, pt. 2, 1889, p. 116K.—Walcott, Bull. Geol. Soc. Amer. 1, 1890, p. 339.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 145.—Gurley, Jour. Geol., 4, 1896, p.

**Diplograptus (Glyptograptus) angustifolius**—Continued.

298.—Ruedemann, Bull. New York State Mus. 42, 1901, p. 541ff.—Weller, Geol. Sur. New Jersey, Pal., 3, 1903, p. 212, pl. 16, figs. 8, 9.—Dale, Bull. U. S. Geol. Sur., 242, 1904, p. 33.

*Diplograptus (Glyptograptus) angustifolius* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 366–369, pl. 25, figs. 19, 20, text figs. 311–314.

*Diplograptus (Graptolithus) angustifolius* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 206, figs.

Chazyan (Normanskill): Glenmont, Stockport, Lansingburg, etc., New York; Kicking Horse Pass, Canada; Silver Peak Quadrangle, Nevada; Arkansas; Quebec; New Jersey; Great Britain.

**DIPLOGRAPTUS BARBATULUS** Salter. See *Diplograptus foliaceus*.

**Diplograptus basilicus** (Elles and Wood).

*Orthograptus basilicus* Lapworth, Geol. Mag., 10, 1873, p. 134 (nom. nud.).

*Diplograptus vulgatus* var. *basilicus* Elles and Wood, Mon. British Grapt., pt. 6, 1907, p. 243, pl. 30, figs. 2a–d.

Ordovician: South Scotland (Lower Hartfell); Arkansas (Normanskill-Stringtown).

**DIPLOGRAPTUS BICORNIS** Geinitz. See *Climacograptus bicornis*.

**DIPLOGRAPTUS BIMUCRONATUS** Nicholson. See *Lasiograptus bimucronatus*.

**DIPLOGRAPTUS CILIATUS** Walcott. See *Glossograptus ciliatus*.

**Diplograptus crassitestus** Ruedemann.

*Diplograptus crassitestus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 354, 355, pl. 25, fig. 6, text figs. 299–300.

Richmond (Sylvan): Arbuckle Mountains, Oklahoma.

*Cotypes*.—Cat. No. 54266, U.S.N.M.

**DIPLOGRAPTUS DENTATUS** Lapworth. See *Diplograptus (Glyptograptus) euglyphus*.

**Diplograptus dentatus** (Brongniart).

*Fucoides dentatus* Brongniart, Hist. Veget. Foss., 1, 1828, p. 70, pl. 6, figs. 9–12.

*Graptolithus pristiniiformis* Hall, Geol. Sur. Can. Rep., 1857, p. 133; Canadian Nat. Geol., 3, 1858, p. 167.

*Diplograptus pristiniiformis* Hall, Geol. Sur. Can., dec. 2, 1865, p. 110ff, pl. 13, figs. 15–17.—Nicholson, Quar. Jour. Geol. Soc., 24, 1868, p. 140, pl. 5, figs. 14, 15.

*Diplograptus dentatus* Hopkinson and Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 656, pl. 34, figs. 5a–k.—Emerson, Narrative Hall's 2d Arctic Exped. U. S. Navy Dept., 1879, p. 576.—Ami, Geol. Sur. Can. Rep., 2d ser., 3, pt. 2, 1889, p. 117k.—Gurley, Jour. Geol., 4, 1896, p. 298.—Elles, Quar. Jour. Geol. Soc., 54, 1898, p. 517.—Ruedemann, New York State Pal., Ann. Rep., 1902, p. 570; Mem. New York State Mus., 7, pt. 1, 1904, pp. 719–721, pl. 17, figs. 10–13, text fig. 100.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 34.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Deepkill, Rensselaer and Columbia Counties, New York (Deepkill, *D. dentatus* zone); Arkansas; England (Skiddaw); Wales (Arenig); Sweden.

**DIPLOGRAPTUS DISSIMILARIS** Emmons. See *Diplograptus foliaceus*.

**DIPLOGRAPTUS ETHERIDGII** Hopkinson. See *Cryptograptus tricornis*.



**Diplograptus (Glyptograptus) euglyphus** (Lapworth).

*Diplograptus dentatus* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 4, 1870, p. 424; Belfast, Nat. Field Club Rep. and Proc., 1, pt. 4, App., 1877, p. 132, pl. 6, fig. 13; Geol. Soc. Quar. Jour., 34, 1878.

*Diplograptus (Glyptograptus) euglyphus* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 166, pl. 4, figs. 14a-e.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 369-370, pl. 25, figs. 22, 23, text figs. 315-316.—

*Diplograptus euglyphus* Lapworth, Ann. Mag. Nat. Hist., 5th ser., 6, 1880, p. 21; Proc. and Trans. Roy. Soc. Can., 4, 1887, p. 177; Canadian Rec. Sci., 3, 1888, p. 141 (loc. occ.); Can. Geol. Surv. Rep., 1887-88, 2d ser., 3, pt. 1, p. 95B.

Middle Ordovician: Great Britain (Glenkiln); Dease River, British Columbia; Griffin Cove, etc., Quebec; Glenmont, Speigletown, etc., New York (Normanskill); Silver Peak Quadrangle, Nevada; Arkansas.

*Plesiotype*.—Cat. No. 54266, U.S.N.M.

**Diplograptus euglyphus pygmæus** Ruedemann.

*Diplograptus euglyphus* var. *pygmæus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 371, pl. 25, figs. 317, 318.

Trenton (Canajoharie): Near Lansingburg, New York.

**Diplograptus foliaceus** (Murchison).

?*Fucoides dentatus* Conrad, New York State Surv., 2d Ann. Rep., 1838, p. 114.—Vanuxem, *ibid.*, p. 283.

*Graptolithus foliaceus* Murchison, Sil. Syst., 1839, p. 694, pl. 26, fig. 3.—Portlock, Geol. Rep., 1843, p. 320, pl. 19, fig. 9.

*Diprion foliaceus* Harkness, Geol. Soc. London Quart. Jour., 7, 1850, pl. 1, fig. 13b.

*Diplograptus foliaceus* Geinitz, Die Grapt., 1852, pl. 1, figs. 29, 30.—Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 29; Belfast Nat. Field Club Rep. and Proc., 1, pt. 4, App., 1877, p. 133, pl. 6, fig. 18.—Linnarsson, Sver. Geol. Und., Ser. C., 31, 1879, p. 16ff.—Tullberg, Sver. Geol. Und., Ser. C, 41, 1880, p. 20; *ibid.*, 50, 1882, p. 20.—Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, pp. 177ff.—Ami, Can. Geol. Surv. Rep., 2d ser., 3, pt. 2, 1888, p. 117K.—Geinitz, Mitth. k. Min. geol. praeh. Mus. Dresden, 9, 1890, p. 37, pl. A.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 1892, 3, p. 404.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 145.—Gurley, Jour. Geol., 4, 1896, p. 298.—Hall, Roy. Soc. Proc., 9, 1896, p. 185; *ibid.*, 10, 1897, p. 14; Geol. Mag., n. s., dec. 4, 6, 1899, p. 445.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 497ff.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—T. S. Hall, Geol. Surv. Victoria Rec., 1, pt. 1, 1902, p. 34f; Geol. Surv. New South Wales Rec., 7, pt. 2, 1902, p. 4, pl. 12, fig. 7.—Weller, Geol. Surv. New Jersey Pal., 3, 1902, p. 53.—Ami, Geol. Surv. Canada, Summ. Rep., 1905, p. 12.—Grabau and Shimer, N. A. Index Fossils 1, 1906, p. 33.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 341-346, pl. 24, figs. 1-8, pl. 25, figs. 1, 2, text figs. 279-282, pl. 25, figs. 7-9.

*Fucoides simplex* Emmons, Tac. Syst., 1844, p. 27, pl. 5, fig. 1; Agric. New York, 1, 1847, pl. 17, fig. 1.

*Graptolithus pristis* (part) Hall, Pal. New York, 1, 1847, p. 265, pl. 72, figs. 1-ac; Pal. New York, 3, 1859, p. 516, fig. 2; New York State Cab. Nat. Hist., 13th Ann. Rep., 1860, p. 60, fig. 2; Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 36, fig. 30; New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, pp. 204, 205, fig. 2.

*Graptolithus (Diplograptus) pristis* White, Rep. Wheeler Surv., 4, 1875, p. 65, pl. 4, fig. 2.

**Diplograptus foliaceus**—Continued.

*Diplograptus pristis* Marcou, Geol. Map United States, 1853, p. 24, pl. 1, fig. 10.—Hopkinson, Micro. Club Jour., 1, 1869, pl. 8, fig. 11a.—Carruthers, Geol. Mag., 5, 1868, p. 130, pl. 5, figs. 13a-d.—Nicholson, Mon. British Grapt., 1872, fig. 22, p. 54; p. 58, fig. 26; p. 69, fig. 39A; p. 116, fig. 58.—Hopkinson and Lapworth, Geol. Soc. London Quart. Jour., 31, 1875, pp. 656-657, pl. 35, figs. 7a-g.—Walcott, Alb. Inst. Trans., 10, 1883 (adv. sheets, 1879, p. 34), p. 4 (loc. occ.).—Whitfield, Amer. Jour. Sci., 3d ser., 1883, 26, p. 380.—Tullberg, Zeitschr. d. deutsch. geol. Gesell., 35, 1883, p. 241.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.—Ruedemann (part), New York State Geol. Rep., 1897, p. 219, pl. 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 33, fig. 54.

*Graptolithus folium* et *G. pristis* Salter, Geol. Soc. London Quart. Jour., 5, 1849, p. 15, pl. 1, figs. 5, 6.

*Diplograptus rugosus* Emmons, Amer. Geol., 1, pt. 2, 1856, p. 105, pl. 1, fig. 26.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 168.

*Diplograptus dissimilaris* Emmons, Amer. Geol., 1, pt. 2, 1855, p. 105, pl. 1, fig. 5.

*Dicranograptus dissimilaris* Gurley, Jour. Geol., 4, 1896, p. 95 (gen. ref.).

*Diplograptus secalinus* Hall, Pal. New York, 1, 1847, p. 267, pl. 72, figs. 2a-c.

*Diplograptus barbatulus* Salter, Mem. Geol. Surv. Great Britain, 3, 1866, pl. 2a, figs. 1e-d.

*Graptolithus* (*Diplograptus*) *hypniformis* White, Geogr. and Geol. Expl. West 100th Merid., Prel. Rep., 1874, p. 12; *ibid.*, 4, War Dep., 1877, p. 63, pl. 4, fig. 4a, b.

*Diplograptus obliquus* Emmons, Amer. Geol., 1, pt. 2, 1855, p. 106, pl. 1, fig. 22.

*Diplograptus laciniata* Emmons, Amer. Geol., 1, pt. 2, 1855, p. 236, pl. 1, fig. 24.

Middle Ordovician: Great Britain (Glenkiln and Hartfell); Scandinavia, Australia, Nevada, Oklahoma, Arkansas, Canada, New York, etc. (Normanskill, etc.).

*Plesiotype*.—Cat. No. 8556, U.S.N.M. (Holotype of *G. hypniformis*).

**DIPLOGRAPTUS FOLIACEUS** Ruedemann (part). See *Glossograptus* (*Orthograptus*) *quadrimumcronatus*.

**Diplograptus foliaceus acutus** Lapworth.

*Graptolithus pristis* Hall (?Hisinger), Pal. New York, 1, 1847, pl. 72, fig. 10, 1p.

*Diplograptus foliaceus* var. *acutus* (Lapworth MS.) Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 349-351, pl. 25, figs. 1, 2, text figs. 288-293.

Middle Ordovician: Stockport, etc., New York (Normanskill); Canada; Scotland (Glenkiln); Shropshire (Upper Llandeilo).

**Diplograptus foliaceus alabamensis** Ruedemann.

*Diplograptus foliaceus* var. *alabamensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 352, pl. 25, fig. 3.

Chazy (Athens): Pratts Ferry, Bibb County, Alabama.

**DIPLOGRAPTUS FOLIACEUS** mut. **AMPLEXICAULE** Gurley. See *Diplograptus* (*Glyptograptus*) *amplexicaulis*.

**Diplograptus foliaceus incisus** Lapworth.

*Graptolithus pristis* Hall (not Hisinger), Pal. New York, 1, 1847, pl. 72, fig. 11.

*Diplograptus foliaceus* var. *incisus* (Lapworth MS.) Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 347-349, pl. 24, figs. 198, text figs. 283-287.

Chazy: One-half mile below Little Mechin Point, Quebec; Stockport and Glenmont, New York (Normanskill).



**Diplograptus foliaceus trifidus** (Gurley).

Diplograptus trifidus Gurley, Geol. Surv. Ark. Rep., 3, 1890, 417, pl. 9, figs. 3, 4; Jour. Geol., 4, 1896, pp. 298, 307.

Diplograptus foliaceus var. trifidus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 351, 352, fig. 295.

Chazyan (Normanskill): Arkansas.

Cotypes.—Cat. No. 54260, U.S.N.M.

DIPLOGRAPTUS FOLIACEUS VESPERTINUS Ruedemann. See Diplograptus vespertinus.

**Diplograptus hudsonicus** Nicholson.

Diplograptus Hudsonicus Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 38, fig. 15.

Cincinnati (Pulaski): River Humber, Ontario.

**Diplograptus inutilis** Hall.

Diplograptus inutilis Hall, Geol. Surv. Canada, dec. 2, 1865, p. 111, pl. 13, fig. 14.—Gurley, Jour. Geol., 4, 1896, p. 298.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 570; Mem. New York State Mus., 7, pt. 1, 1904, p. 721, pl. 16, figs. 12, 13.

Canadian: Point Levis, Quebec (Levis, Diplograptus dentatus zone); Deepkill, Rensselaer County, New York (Deepkill, D. dentatus zone).

DIPLOGRAPTUS LAXUS Ruedemann. See Cryptograptus antennarius.

**Diplograptus longicaudatus** Ruedemann.

Diplograptus longicaudatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 723, pl. 16, fig. 11.

Canadian (Deepkill, Diplograptus dentatus zone): Deepkill, Rensselaer County, New York.

**Diplograptus (Amplexograptus) macer** Ruedemann.

Diplograptus (Amplexograptus) macer Ruedemann, Mem. New York State Mus., 162, 1912, p. 82, pl. 2, figs. 20, 21.

Trenton (Canajoharie): Minaville, New York.

DIPLOGRAPTUS MARCIDUS Walcott. See Cryptograptus tricornis.

**Diplograptus (Mesograptus) mohawkensis** Ruedemann.

Diplograptus (Mesograptus) mohawkensis Ruedemann, Bull. New York State Mus., 162, 1912, p. 80, pl. 2, figs. 18, 19.

Trenton (Canajoharie): Near Amsterdam and near Saratoga, New York.

DIPLOGRAPTUS MUCRONATUS Geinitz. See Lasiograptus mucronatus.

**Diplograptus peosta** Hall.

Graptolithus pristis (part) Hall, Pal. New York, 1, 1847, p. 72, figs. 1f, 1g.

Graptolithus (Diplograptus) peosta Hall, Geol. Surv. Wisconsin Rep., 1861, p. 17.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 47, pl. 5, fig. 12.

Diplograptus peosta Hall, Geol. Wisconsin, 1, 1862, p. 430; 20th Rep. New York State Cab. Hist., 1868, p. 223.—Gurley, Jour. Geol., 4, 1896, p. 298.—James, Amer. Geol., 5, 1890, p. 354.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 372–374, pl. 25, fig. 17, text figs. 319–322; Bull. New York State Mus., 162, 1912, p. 83, fig. 23, pl. 2, fig. 17.

Diplograptus pristis Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1897, p. 81, fig. 2.

**Diplograptus peosta**—Continued.

*Diplograptus amplexicaulis* Whitfield and Hovey (part), Bull. Amer. Mus. Nat. Hist., 11, pt. 1, 1898, pp. 20-21.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 561.

Richmond (Maquoketa): Graf, etc., Iowa; Wisconsin; Illinois; Minnesota; etc.

**DIPLOGRAPTUS PRISTINIFORMIS** Ruedemann. See *Lasiograptus* (*Thysanograptus*) *eucharis*.

**DIPLOGRAPTUS PRISTINIFORMIS** Hall (part). See *Diplograptus dentatus*.

**DIPLOGRAPTUS PRISTIS** Ruedemann (part). See *Glossograptus* (*Orthograptus*) *quadrimumcronatus*.

**DIPLOGRAPTUS PRISTIS** Nicholson. See *Diplograptus foliaceus*.

**DIPLOGRAPTUS PRISTIS** Winchell and Schuchert. See *Diplograptus peosta*.

**DIPLOGRAPTUS PRISTIS** Hall (part). See *Diplograptus foliaceus vespertinus*.

**DIPLOGRAPTUS PUTILLUS** Hall. See *Climacograptus putillus*.

**DIPLOGRAPTUS QUADRIMUMCRONATUS** Nicholson. See *Glossograptus* (*Orthograptus*) *quadrimumcronatus*.

**DIPLOGRAPTUS RUEDEMANNI** Gurley. See *Lasiograptus* (*Thysanograptus*) *eucharis*.

**DIPLOGRAPTUS RUGOSUS** Emmons. See *Diplograptus foliaceus*.

**DIPLOGRAPTUS SECALINUS** Eaton. See *Diplograptus foliaceus*.

**DIPLOGRAPTUS? SEXTANS** McCoy. See *Dicellograptus sextans*.

**DIPLOGRAPTUS SPINULOSUS** Walcott. See *Glossograptus ciliatus*.

**DIPLOGRAPTUS TERETUSCULUS** var. *PUTILLUS* Frech. See *Climacograptus putillus*.

**DIPLOGRAPTUS TRICORNIS** Carruthers. See *Cryptograptus tricornis*.

**DIPLOGRAPTUS TRIFIDUS** Gurley. See *Diplograptus foliaceus trifidus*.

**Diplograptus vespertinus** (Ruedemann).

*Diplograptus pristis* (part) Hall, Pal. New York, 1, 1847, pl. 72, figs. 1, 1a, 1b, 1k, 1l.

*Diplograptus foliaceus* mut. *vespertinus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 352-354, pl. 25, figs. 4, 5, 18, text figs. 296-298.

*Diplograptus vespertinus* Ruedemann, Bull. New York State Mus., 162, 1912, p. 83.

Chazy (Normanskill): Van Schaick Island, etc., New York.

Trenton (Canajoharie): Mohawk Valley, New York.

**DIPLOGRAPTUS VULGATUS** var. *ACUTUS* Elles and Wood. See *Diplograptus acutus*.

**DIPLOGRAPTUS VULGATUS** var. *BASILICUS* Elles and Wood. See *Diplograptus basilicus*.

**DIPLOGRAPTUS WHITFIELDI** Nicholson. See *Glossograptus whitfieldi*.

**DIPLOPHYLLUM** Hall. See *Diphyphyllum* Lonsdale.

**DIPLOSTENOPORA** Ulrich and Bassler. Genotype: *Escharopora siluriana* Weller.

*Diplostenopora* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 276.



**Diplostenopora silluriana** (Weller).

*Escharopora silluriana* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 225, pl. 18, figs. 6-7; pl. 19, figs. 8, 9.

*Diplostenopora silluriana* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 277, pl. 45, figs. 3-6; pl. 48, figs. 1-3; pl. 52, figs. 3-4.

Helderbergian: Two miles south Tristates, New York (Decker Ferry); Cash Valley, etc., near Cumberland, Maryland (Keyser).

**DIPLOTRYPA** Nicholson (part). See *Mesotrypa* Ulrich.

**DIPLOTRYPA** Nicholson.

Genotype: *Favosites petropolitanus* Pander.

*Diplotrypa* Nicholson, Pal. Tab. Corals, 1879, p. 292; Genus *Monticulipora*, 1881, pp. 101, 155.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 153.—Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 13.—Roemer, Leth. geog., 1, Leth. Pal., 1883, p. 472.—Miller, N. A. Geol. Pal., 1889, p. 187.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 378, 457.—Rominger, Amer. Geol., 6, 1890, pp. 116-119.—Ulrich, Geol. Minnesota, 3, 1893, p. 285; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275; also (not Ulrich) p. 104 (in part).—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, p. 36.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 47; Zittel-Eastman Textb. Pal., 1913, p. 338; Bull. U. S. Nat. Mus., 77, 1911, pp. 312, 313.

*Callopora* (not Hall) Dybowski, Die Chætetiden d. Ostb. Silur-Form., 1877, p. 106.

**Diplotrypa? dubia** Ulrich.

*Diplotrypa? dubia* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 459, pl. 33, figs. 3-3b.

*Monticulipora dubia* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 182.

*Dianulites dubia* Miller, N. A. Geol. Pal., 2d App., 1897, p. 728 (gen. ref.).

Richmond (Fernvale): Wilmington, Illinois.

Sections of *holotype*.—Cat. No. 43390, U.S.N.M.

**DIPLOTRYPA** INFIDA Ulrich. See *Mesotrypa infida*.

**Diplotrypa limitaris** Ulrich.

*Diplotrypa limitaris* Ulrich, Geol. Minnesota, 3, 1893, p. 286, fig. 18.—Sardeson, Jour. Geol., 9, 1901, p. 8, pl. A, figs. 3, 4.

*Dianulites limitaris* Miller, N. A. Geol. Pal., 2d App., 1897, p. 728 (gen. ref.).

Trenton (Prosser): Goodhue County, Minnesota.

*Holotype*.—Cat. No. 43534, U.S.N.M.

**DIPLOTRYPA** MILLERI Ulrich. See *Mesotrypa nummiformis*.

**Diplotrypa neglecta** Ulrich.

*Diplotrypa neglecta* Ulrich, Geol. Minnesota, 3, 1893, p. 287, fig. 19.

*Dianulites neglecta* Miller, N. A. Geol. Pal., 2d App., 1897, p. 728 (gen. ref.).

Trenton (Prosser): Hader, Minnesota.

*Holotype*.—Cat. No. 43533, U.S.N.M.

**DIPLOTRYPA** PATELLA Ulrich. See *Mesotrypa patella*.

**DIPLOTRYPA** QUEBECENSIS Ami. See *Mesotrypa quebecensis*.

**DIPLOTRYPA** REGULARIS Foord. See *Mesotrypa regularis*.

**Diplotrypa walkeri** Bassler.

*Diplotrypa walkeri* Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 47-48, pl. 16, figs. 1-5; pl. 25, fig. 4.

Clinton (Rochester): Lockport and Rochester, New York; Grimsby, Ontario.

*Cotypes*.—Cat. No. 35527, U.S.N.M.

**Diplotrypa westoni** Ulrich.

*Diplotrypa westoni* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 30, pl. 8, figs. 4-4b; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 457 (p. 274).—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 163.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 323, fig. 201; Zittel-Eastman Textb. Pal., 1913, p. 338.

Black River or Richmond: Big Island, Lake Winnipeg, Manitoba.

Ordovician (Chasmops): Nittsjo Rätvik, Dalarne, Sweden, and south of Bödöhamn, island of Eland, Baltic Sea.

Part of *holotype*.—Cat. No. 43810, U.S.N.M.

**DIPRION FOLIACEUS** Harkness. See *Diplograptus foliaceus*.

**DISCINA** Hall. See *Orbiculoidea* D'Orbigny.

**DISCINA CIRCE** Billings. See *Orbiculoidea lamellosa*.

**DISCINA CLARA** Spencer. See *Schizotreta tenuilamellata*.

**DISCINA CONCORDENSIS** Sardeson. See *Schizotreta pelopea*.

**DISCINA DEFORMIS** Lincklaen. See *Archinacella deformata*.

**Discina?? fletcheri** Ami.

*Discina fletcheri* Ami, Proc. and Trans. Nova Scotian Inst. Sci., 8, 1895, p. 412.

Silurian: Antigonish County, Nova Scotia.

**DISCINA FORBESI** Nicholson. See *Schizotreta tenuilamellata*.

**DISCINA LAMELLOSA** Hitchcock. See *Orbiculoidea lamellosa*.

**Discina?? novascotica** Ami.

*Discina novascotica* Ami, Proc. and Trans. Nova Scotian Inst. Sci., 8, 1895, p. 412.

Silurian: Antigonish County, Nova Scotia.

**Discina?? orientalis** Ami.

*Discina orientalis* Ami, Proc. and Trans. Nova Scotian Inst. Sci., 8, 1895, p. 413.

Silurian: Antigonish County, Nova Scotia.

**DISCINA PARMULATA** Lincklaen. See *Orbiculoidea parmulata*.

**DISCINA PELOPEA** Billings. See *Schizotreta pelopea*.

**DISCINA SOLITARIA** Ringueberg. See *Schizotreta tenuilamellata*.

**Discina sublamellosa** Ulrich.

*Discina sublamellosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 97, pl. 4, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 344.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 218.

Eden (Economy): Covington, Kentucky.

Observation.—Probably not a brachiopod; possibly a pelecypod.

**DISCINA TENUILAMELLATA** VAR. *SUBPLANA* Hall. See *Orbiculoidea subplana*.

**DISCINA TENUISTRIATA** Ulrich. See *Orbiculoidea tenuistriata*.



*DISCINA TRUNCATA* Emmons. See *Orbiculoidea lamellosa*.

*DISCINA VANUXEMI* Hall. See *Orbiculoidea vanuxemi*.

**DISCOCERAS** Barrande.

Genotype: *Clymenia antiquissima* Eichwald.

*Discoceras* Barrande, *Cephalopodes*; Ext. Syst. Sil. du Centre Boheme, 1877, p. 95.—Angelin, *Fragmenta Silurica*, 1880, p. 9.—Zittel, *Handb. Pal.*, 2, 1884, p. 377.—Remele, *Zeits. d. d. geol. Gesell.*, 28, 1886, p. 468.—Schröder, *Pal. Abhandl. von Dames u. Kayser, Neue Folge*, 1, Heft. 4, Jena, 1891, p. 20.—Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 500.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 51.—Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 772.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 72.

***Discoceras canadense*** Whiteaves.

*Discoceras Canadense* Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 3, 1897, p. 227, pl. 22, figs. 3, 3a.

Black River or Richmond: Little Black Island; Lake Winnipeg, Canada.

*DISCOCERAS EATONI* Schroeder. See *Schroederoceras eatoni*.

***Discoceras graftonense*** (Meek and Worthen).

*Lituites Graftonensis* Meek and Worthen, *Proc. Acad. Nat. Sci. Philadelphia*, 1870, p. 51; *Geol. Surv. Illinois*, 6, 1875, p. 507, pl. 25, fig. 1.—Newell, *Proc. Boston Soc. Nat. Hist.*, 1888, 23, p. 485 (loc. occ.).—Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 2, 1895, p. 105.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 72.

*Lituites multicostatus* Whitfield, *Ann. Rep. for 1879, 1880*, p. 67; *Geol. Wisconsin*, 4, 1882, p. 303, pl. 20, fig. 7.—Newell, *Proc. Boston Soc. Nat. Hist.*, 23, 1888, p. 486 (loc. occ.).

*Trocholites multicostatus* Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 1, 1884, p. 36, pl. 6, figs. 1, 1a.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1890, p. 1229, figs.

Niagaran: Grafton, Illinois; Waukesha, Wisconsin; Indiana; Elora and Hespeler, Ontario (Guelph).

*DISCOCERAS INTERNISTRIATUM* Schroeder. See *Trocholites internistriatus*.

***Discoceras marshi*** (Hall).

*Lituites marshii* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 362-pl. 16 (7), figs. 6, 7; rev. ed., 1870, p. 404, pl. 16, figs. 6, 7.—Nettelroth, *Kentucky Foss. Shells*, *Geol. Surv. Kentucky*, 1889, p. 195, pl. 30, fig. 1.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 473, pl. 21, fig. 4.

*Discoceras marshii* Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 72, fig. 1284.

Niagaran: Kankakee, Illinois; Louisville, Kentucky; Wabash, Indiana.

*Plesiotype*.—Cat. No. 51378, U.S.N.M.

***Discoceras ortonii*** (Meek).

*Lituites? Ortoni* Meek, *Geol. Surv. Ohio*, *Pal.*, 1, 1873, p. 186, pl. 15, fig. 4 (*Gyroceras? Ortoni* at end of description).

*Discoceras ortonii* Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 773 (gen. ref.).

Niagaran (Guelph): Greenville, Darke County, Ohio.

*DISCOLITES* Emmons. See *Microceras* Hall.

*DISCOLITES MINUTUS* Emmons. See *Microceras inornatum*.

**DISCOPHYCUS** Walcott.Genotype: *D. typicale* Walcott.

*Discophycus* Walcott, Trans. Albany Inst., 10, 1883, p. 19 (adv. sheets, 1879).—  
Miller, N. A. Geol. Pal., 1889, p. 117.

**Discophycus typicale** Walcott.

*Discophycus typicalis* Walcott, Trans. Albany Inst., 10, 1883, p. 19, pl. 2, figs. 18, 18a (adv. sheets, 1879).—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 128, pl. 5, fig. 4.  
Utica: Trenton, Oneida County, New York.

**DISCOPHYLLUM** Hall.Genotype: *D. peltatum* Hall.

*Discophyllum* Hall, Pal. New York, 1, 1847, p. 277

**Discophyllum peltatum** Hall.

*Discophyllum peltatum* Hall, Pal. New York, 1, 1847, p. 277, pl. 75, fig. 3.  
Chazy (Normanskill) or Trenton (Snake Hill): Near Troy, New York.

**DISCOSORUS** Hall.Genotype: *D. conoideus* Hall

*Discosorus* Hall, Pal. New York, 2, 1852, p. 99, pl. 28.—Woodward, Man. Mollusca, pt. 3, 1856, p. 449.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 81.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 272.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 194.—Miller, N. A. Geol. Pal., 1889, p. 436.

**Discosorus conoideus** Hall.

Columns of circular discs, etc., Bigsby, Trans. Geol. Soc. London, ser. 2, 1, 1824, p. 204, pl. 30, figs. 4, 6.  
*Discosorus conoideus* Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 222, pl. 34, figs. 2, 3; Pal. New York, 2, 1852, p. 99, pl. 28, figs. 13a-c.—Whitfield, Geol. Wisconsin, 4, 1882, p. 209, pl. 20, fig. 6.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 196, fig. 25.  
*Orthoceras?* (*Discosorus*) *conoideus* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1864, p. 750, pl. 232, 437, 474.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 286; Geol. Surv. Ohio, Pal., 7, 1893, p. 546, pl. 36, fig. 8.  
*Gomphoceras conoideum* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 2, 1899, p. 172. (Regarded as internal cast of siphon.)  
Silurian: Ontario and Lockport, New York (Lower Clinton); Todds Fork, Clinton County, Ohio (Brassfield); Ashford, etc., Wisconsin; Drummond Island, Lake Huron (Niagaran).

**Discosorus gracilis** Foord.

*Discosorus* ——— Barrande, Syst. Sil. Boheme, 2, suppl. 1877, pl. 474, figs. 9, 10.  
*Discosorus gracilis* Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 198, fig. 26.  
Niagaran: Drummond Island, Lake Huron.

**Discosorus remotus** Foord.

Columns of circular discs, etc., Bigsby, Trans. Geol. Soc., 2d ser., 1, 1824, p. 204, pl. 30, fig. 7.  
*Discosorus remotus* Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 197.  
Niagaran: Drummond Island, Lake Huron.

**DISCOTRYPA** Ulrich.Genotype: *Chaetetes elegans* Ulrich.

*Discotrypa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155.—Miller, N. A. Geol. Pal., 1889, p. 300.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 378.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 30.



**Discotrypa elegans** (Ulrich).

*Chætetes elegans* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 130, pl. 12, figs. 12, 12a.

*Discotrypa elegans* Ulrich, *ibid.*, 6, p. 163, pl. 7, fig. 1-1b.

*Monticulipora elegans* James and James, *ibid.*, 10, 1888, p. 165.—J. F. James, *ibid.*, 16, 1894, p. 180.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43653, U.S.N.M.

**DISTACODUS** Hinde.

Genotype: *Machairodus incurvus* Pander.

*Machairodus* Pander, Mon. Foss. Fische Sil. Syst., 1856, p. 23.

*Distacodus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 357. (Proposed for *Machairodus* Pander, preoccupied by Kaup.)—Miller, N. A. Geol. Pal., 1889, p. 518.

**Distacodus incurvus** (Pander).

*Machairodus incurvus* Pander, Mon. Foss. Fische Sil. Syst., 1856, p. 23, tab. 1, fig. 22.

*Distacodus incurvus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 357, pl. 15, fig. 9.

Middle Ordovician: Esthonia, Russia.

Maysville (Pulaski): Garrison Common, near Toronto, Ontario.

**DITŒCHOLASMA** Simpson.

Genotype: *Petraia fanningana* Safford.

*Ditœcholasma* Simpson, Bull. New York State Mus., 39, 1900, p. 200.

**Ditœcholasma fanninganum** (Safford).

*Petraia Fanningana* Safford, Geol. Tennessee, 1869, p. 320, pl. 5, (H), figs. 3a-g.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 627, figs.

*Duncanella fanningana* Girty, 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 552.

*Ditœcholasma fanninganum* Simpson, Bull. New York State Mus., 39, 1900, p. 201, figs. 5, 6.

*Ditœcholasma* (*Petraia*) *fanningana* Foerste, Jour. Geol., 11, 1903, p. 713 (loc. occ.).

Niagaran (Brownspport): Decatur, Perry, and Wayne Counties, Tennessee.

**DOLABRA CARINATA** Meek. See *Whitella carinata*.

**DOLABRA STERLINGENSIS** Meek and Worthen. See *Whitella sterlingensis*.

**DOLICHOMETOPUS** Angelin.

Genotype: *D. suecicus* Angelin.

*Dolichometopus* Angelin, Pal. Scandinavica, 3d ed., Holmiœ, 1878, p. 72.—

Woodward, Geol. Mag., dec. 3, 1, 1884, p. 343.—Zittel, Handb. Pal., 2, 1885,

p. 599.—Miller, N. A. Geol. Pal., 1889, p. 545.—Koken, Die Leitfossilien,

Leipzig, 1896, p. 15.—Matthew, Trans. Royal Soc. Canada, 2d ser., 3, sec.

4, 1897, pp. 184, 195.—Walcott, Cam. Faunas China, Yearb. Carnegie Inst., 3,

1913, p. 215.—Clarke, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 783.

*Amphoton* Lorenz, Zeit. deutsch. geol. Gesell., 58, 1906, p. 75. (Genotype: *A. steinmanni* Lorenz.)

**Dolichometopus(?) convexus** Billings.

*Dolichometopus?* *convexus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 269, fig. 253.

Canadian (Quebec-G): Port aux Choix, Newfoundland.

**Dolichometopus(?) gibberulus** Billings.

*Dolichometopus?* *gibberulus* Billings, Pal. Foss., 1, 1865, Geol. Surv. Canada, p. 269, fig. 254.

Canadian (Quebec-G): Port aux Choix, Newfoundland.

**Dolichometopus mccoylei** (Walcott).

Barrandia? McCoyi Walcott, Mono. U. S. Geol. Surv., 8, 1884, p. 96, pl. 12, fig. 5.

Niobe Maccoyi Frech, Leth. geog., Leth. Pal., 2, 1897, pl. 1b, fig. 2.

Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.

*Cotype*.—Cat. No. 24650, U.S.N.M.

**Dolichometopus(?) rarus** Billings.

Dolichometopus? rarus Billings, Pal. Foss., 1, 1865, p. 352, text fig. 338.

Canadian (Beekmantown): Township of Oxford, Canada.

**DOLICHOPTERUS** Hall.

Genotype: *D. macrocheirus* Hall.

Dolichopterus Hall, Pal. New York, 3, 1859, p. 414.—Zittel, Handb. Pal., 2, 1885, p. 651.—Miller, N. A. Geol. Pal., 1889, p. 545.—Laurie, Nat. Sci., 3, 1893, p. 125.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 676.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230; Bull. New York State Mus., 45, 1901, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 410.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 258.

**Dolichopterus breviceps** Clarke and Ruedemann.

Dolichopterus breviceps Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 414, fig. 98.

Chazy (Normanskill): Catskill, New York.

**Dolichopterus frankfortensis** Clarke and Ruedemann.

Dolichopterus frankfortensis Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 268, pl. 83, figs. 9–14.

Trenton (Schenectady): Schenectady, Aqueduct, Rotterdam Junction, and Duaneburg, New York.

**Dolichopterus latifrons** Clarke and Ruedemann.

Dolichopterus latifrons Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 269, pl. 83, figs. 15–16.

Trenton (Schenectady): Schenectady, New York.

**Dolichopterus macrocheirus** Hall.

Dolichopterus macrocheirus Hall, Pal. New York, 3, 1859, p. 414, pl. 83, fig. 1, pl. 83a, fig. 1.—Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1881, p. 20.—Grabau, Bull. New York State Mus., 45, 1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 410, fig. 1711.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 262, pl. 35, fig. 1; pls. 40–45, text fig. 61.

Cayuga (Bertie): Williamsville, Litchfield, etc., New York.

*Plesiotype*.—Cat. No. 60052, U.S.N.M.

**Dolichopterus otisius** (Clarke).

Pterygotus? otisius Clarke, Bull. New York State Mus., 107, 1907, p. 308, pl. 6, figs. 6, 7.

Dolichopterus otisius Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 270, pl. 46, figs. 1–8.

Medinan (Shawangunk): Otisville, New York; Delaware Water Gap, Pennsylvania.

**Dolichopterus siluriceps** Clarke and Ruedemann.

Eusarcus scorpionis Pohlman, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 30, pl. 3, fig. 3.

Dolichopterus siluriceps Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 273, pl. 26, fig. 3.

Cayuga (Bertie): Williamsville, New York.



**Dolichopterus stylonuroides** Clarke and Ruedemann.

*Dolichopterus stylonuroides* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 276, pl. 46, figs. 9-14.

Medinan (Shawangunk): Otisville, New York.

**Dolichopterus(?) testudineus** Clarke and Ruedemann.

*Dolichopterus(?) testudineus* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 274, pl. 57, figs. 1, 2.

Cayugan (Bertie): Near Crane's Corners, Litchfield, Herkimer County, New York.

**DONACICRINITES BIPARTITUS** Troost. See *Erisocrinus? bipartitus*.

**DOUVILINA** Hall and Clarke. See *Stropheodonta* Hall.

**DREPANELLA** Ulrich.

Genotype: *D. crassinoda* Ulrich.

*Drepanella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, pp. 117, 118 (*Drepanella* in error).—Miller, N. A. Geol. Pal., 1st, App., 1892, p. 707.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 670; Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 311.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 349.

**Drepanella ampla** Ulrich.

*Drepanella ampla* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 120, pl. 8, fig. 2.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 41, fig. 9.

Stones River (?Ridley): Bottom of gorge, High Bridge, Kentucky.

*Holotype*.—Cat. No. 41375, U.S.N.M.

**DREPANELLA AMPLA** var. **ELONGATA** Ulrich (1894). See *Drepanella crassinoda*.

**Drepanella bigeneris** Ulrich.

*Drepanella bigeneris* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 672, pl. 44, figs. 20-22.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 41, figs. 1-3.

Black River (Platteville): Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 41379, U.S.N.M.

**DREPANELLA BILATERALIS** Ulrich. See *Scofieldia bilateralis*.

**Drepanella crassinoda** Ulrich.

*Drepanella crassinoda* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 118, pl. 8, figs. 1a-c.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 291, fig. 18, pl. 41, figs. 4-6.—Grabau and Shimer, N. A. Index Fossils, 1910, p. 349, fig. 16571-n.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 23, fig. 12; Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425o.

*Drepanella ampla* var. *elongata* (in error for *D. crassinoda*) Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 670, fig. 48a-c.

Black River (Lowville): High Bridge, Kentucky; Virginia; Tennessee.

*Holotype*.—Cat. No. 41377, U.S.N.M.

**DREPANELLA CRASSINODA** **NITIDA** Ulrich. See *Drepanella nitida*.

**Drepanella elongata** Ulrich.

*Drepanella elongata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 121, pl. 8, figs. 5a, b.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 41, figs. 10, 11.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 349, fig. 1657o.

*Drepanella macra* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 670, fig. 48d (not 48c = *D. crassinoda*).

Stones River (?Ridley): Bottom of gorge, High Bridge, Kentucky.

*Holotype*.—Cat. No. 41376, U.S.N.M.

**DREPANELLA MACRA** Ulrich (1894). See *Drepanella elongata*.

***Drepanella macra* Ulrich.**

*Drepanella macer* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1894, p. 119, pl. 8, figs. 4a-c.

*Drepanella macra* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 291, fig. 17, pl. 41, figs. 12-14.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 350, fig. 1664a-c.

Stones River (Lebanon): Laverne, Lebanon, and Columbia, Tennessee.

*Holotype*.—Cat. No. 41373, U.S.N.M.

***Drepanella nitida* (Ulrich).**

*Drepanella crassinoda nitida* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 119, pl. 8, figs. 3a, b.

*Drepanella nitida* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 291, fig. 19, pl. 41, figs. 7, 8.

Black River (Lowville): High Bridge, Kentucky.

*Holotype*.—Cat. No. 41378, U.S.N.M.

***Drepanella richardsoni* (Miller).**

*Beyrichia richardsoni* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 347, fig. 40; N. A. Geol. Pal., 1889, p. 535, fig. 978.

*Drepanella richardsoni* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 117.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 292, fig. 23, pl. 41, fig. 15.

Richmond (Whitewater): Wilmington, Ohio.

*Plesiotype*.—Cat. No. 41407, U.S.N.M.

***Drepanella richardsoni canadensis* Ulrich.**

*Drepanella richardsoni* var. *canadensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 118.

Richmond: Oakville, Ontario.

*Cotypes*.—Cat. No. 41374, U.S.N.M.

***Drepanella symmetrica* (Emerson).**

*Beyrichia symmetrica* Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 581, fig. 9.

Richmond: Frobisher Bay, Baffin Land.

*Plastotype*.—Cat. No. 60729, U.S.N.M.

**DREPANODUS** Pander.

Genotype: *D. arcuatus* Pander.

*Drepanodus* Pander, Mon. d. foss. Fische Sil. Syst., 1856, p. 20.—Miller, N. A. Geol. Pal., 1889, p. 518.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 245.

***Drepanodus arcuatus* Pander.**

*Drepanodus arcuatus* Pander, Mon. foss. Fish. Sil. Syst., 1856, p. 20, tab. 1, figs. 2, 4, 5.—Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 357, pl. 15, figs.

7, 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 245, fig. 1537, d, e.

Middle Ordovician: Esthonia, Russia.

Maysville (Pulaski): Garrison Common, near Toronto, Ontario.

**DREPANOPTERUS** Laurie. See *Stylonurus* subgenus *Drepanopterus*.

**DRYMOFORA** Davis. See *Syringopora* subgenus *Drymopora*.

**DRYMOTRYPA** Ulrich. See *Pseudohornera* Roemer.



**DUNCANELLA** Nicholson.Genotype: *D. borealis* Nicholson.

*Duncanella* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 13, 1874, p. 333.—Zittel, Handb. Pal., 1, 1879, p. 226.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 396.—Miller, N. A. Geol. Pal., 1889, p. 187.—Frech, Palæontographica, 37, 1890, p. 81.—Sherzer, Amer. Geol., 7, 1891, pp. 278–283.—Girty, 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 556; Zittel-Eastman Textb. Pal., 1, 1900, p. 74; 2d ed., 1913, p. 82.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 76.

**Duncanella borealis** Nicholson.

*Duncanella borealis* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 13, 1874, p. 334, fig.—Miller, N. A. Geol. Pal., 1889, p. 187, fig. 172.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 76.

*Streptelasma* (*Duncanella*) *borealis* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 106, pl. 5, figs. 7, 8; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 226, pl. 1, figs. 7–10; pl. 4, figs. 7, 8.

*Streptelasma borealis* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1084, figs.

*Streptelasma minima* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 5, figs. 7, 8.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

Clinton (Osgood): Osgood, Indiana.

**DUNCANELLA FANNINGANA** Girty. See *Ditæcholasma fanninganum*.

**DYBOWSKIA** Waagen and Pichl. See *Fistulipora* McCoy.

**DYBOWSKIELLA** Waagen and Wentzel. See *Fistulipora* McCoy.

**DYERIA** Ulrich.Genotype: *Cyrtolites costatus* James.

*Dyeria* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044.

**Dyeria costata** (James).

*Cyrtolites costatus* James, Amer. Jour. Sci., 3d ser., 3, 1872, p. 26.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 150, pl. 13, figs. 1a, b, c.

*Bucania costatus* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 308.

*Dyeria costata*, Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044, text fig. 8.—Grabau, Amer. Nat., 36, 1902, p. 939.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Plesiotypes*.—Cat. No. 45796, U.S.N.M.

**DYSTACTOPHYCUS** Miller and Dyer.Genotype: *D. mammillanum* Miller and Dyer.

*Dystactophycus* Miller and Dyer, Cont. to Pal., 2, 1878, p. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 163.—Miller, N. A. Geol. Pal., 1, 1889, p. 117.

**Dystactophycus mammillanum** Miller and Dyer.

*Dystactophycus mammillanum* Miller and Dyer, Cont. to Pal., 2, 1878, p. 3, pl. 3, fig. 4.—James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 125.—Miller, N. A. Geol. Pal., 1889, p. 118, fig. 34.

Maysville (Corryville): Near Morrow, Ohio.

**DYSTACTOSPONGIA** Miller.Genotype: *D. insolens* Miller.

*Dystactospongia* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 42.—Miller, N. A. Geol. Pal., 1889, p. 158.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 70.

**Dystactospongia insolens** Miller.

*Dystactospongia insolens* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 43, pl. 2, figs. 2a-b.—James, *ibid.*, 14, 1891, p. 70.—Miller, N. A. Geol. Pal., 1889, p. 158, fig. 102.

*Stromatopora insolens* James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 250. Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

**Dystactospongia madisonensis** Foerste.

*Dystactospongia madisonensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 302, pl. 9, figs. 1, 5; *ibid.*, 16, 1910, p. 20.

Richmond (Whitewater-Saluda): Madison, Osgood, and Versailles, Indiana.

**Dystactospongia minima** Ulrich.

*Dystactospongia minima* Ulrich, Amer. Geol., 3, 1889, p. 243.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 70.

Richmond (Waynesville): Hanover, Butler County, Ohio.

*Holotype*.—Cat. No. 46553, U.S.N.M.

**Dystactospongia minor** Ulrich and Everett.

*Dystactospongia minor* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 278, pl. 8, figs. 3a-b.—Hayes and Ulrich, U. S. Geol. Surv., folio 95, 1893, illust. sheet, figs. 48, 49.

Black River: Dixon, Illinois (Platteville); Columbia, etc., Tennessee (Carters). Sections of *holotype* and *plesiotypes*.—Cat. Nos. 46554, 35404, U.S.N.M.

**Dystactospongia rudis** Ulrich and Everett.

*Dystactospongia rudis* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 279, pl. 8, figs. 4, 4a.

Black River (Platteville): Dixon, Illinois.

Sections of *holotype*.—Cat. No. 46555, U.S.N.M.

**EATONIA** Hall.

Genotype: *Atrypa peculiaris* Conrad.

*Eatonia* Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 90; 12th Rep., *ibid.*, 1859, p. 35; Pal. New York, 3, 1859, p. 432.—Billings, Proc. Portland Soc. Nat. Hist., 1863, p. 111.—Zittel, Handb. Pal., 1, 1880, p. 691.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1883, p. 412.—Miller, N. A. Geol. Pal., 1889, p. 345.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 205; 13th Ann. Rep. New York State Geologist, 1895, p. 829.—Koken, Die Leitfossilien, Leipzig, 1896, p. 245.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 760.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 219.

**Eatonia goodlandensis** Kindle and Breger.

*Eatonia goodlandensis* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 439, pl. 8, figs. 10-12.

Niagaran: Near Goodland, Indiana.

**ECCOPTOCHILE?** MEEKANUS Slocum. See *Ceraurinus icarus*.

**ECCULIOMPHALUS** of authors. See *Eccyliomphalus* Portlock.

**ECCYLIOMPHALUS** (part) of authors. See *Eccyliopectus* Remele.

**ECCYLIOMPHALUS** Portlock.

Genotype: *E. bucklandi* Portlock.

*Eccyliomphalus* Portlock, Geol. Rep. Londonderry, 1843, p. 411.

*Eccyliomphalus* McCoy, British Pal. Rocks and Foss., 1854, p. 301.—Remele, Zeits. d. d. geol. Gesell., 40, 1888, p. 666.—Koken, Neues Jahrb. f. Min., Geol.,



**ECCYLIOMPHALUS**—Continued.

Pal., 6, Beilage-Band, 1889, p. 317.—Miller, N. A. Geol. Pal., 1889, p. 402.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 1024, 1029, 1036.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 276.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 662.

*Orthostoma* Conrad, 2d Ann. Rep. New York Geol. Surv., 1838, p. 119.—Miller, N. A. Geol. Pal., 1889, p. 414 (Genotype: *O. commune* Conrad).

*Calauirops* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 314.—Miller, N. A. Geol. Pal., 1889, p. 399.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 662 (Genotype: *C. lituiformis* Whitfield).

***Eccyliomphalus atlanticus*** (Billings).

*Eccyliomphalus Atlanticus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 250.

Canadian (Quebec—F., G.): Bay of St. John and Keppel Island, Newfoundland.

***Eccyliomphalus calciferus*** (Whitfield).

*Euomphalus calciferus* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 47, pl. 8, figs. 12, 13.

Canadian (Beekmantown): Beekmantown, New York.

***Eccyliomphalus (Orthostoma) canadensis*** (Billings).

*Eccyliomphalus Canadensis* Billings, Canadian Nat. Geol., 6, 1861, p. 320, fig. 4; Geol. Canada, Geol. Surv. Canada, 1863, p. 232, fig. 243.

*Calauirops Canadensis* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 315 (gen. ref.).

Canadian (Beekmantown): Ormstown, Phillipsburg, and Point Levis, Quebec.

***Eccyliomphalus circinatus*** (Whiteaves).

*Eccyliomphalus circinatus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 35, pl. 5, figs. 4 a-b; pl. 8, fig. 5; *ibid.*, pt. 2, 1895, p. 86.

Niagaran (Guelph): Galt, Hespeler, Elora, and Durham, Ontario.

***Eccyliomphalus (Orthostoma) communis*** (Conrad).

*Orthostoma communis* Conrad, 2d Ann. Rep. New York Geol. Surv., 1838, p. 119.—Hall, 15th Rep. New York State Cab. Nat. Hist., 1861, pl. 11, fig. 16.—

Miller, N. A. Geol. Pal., 1889, p. 414, fig. 691.

Mohawkian (Trenton?): New York.

***Eccyliomphalus compressus*** (Whitfield).

*Eccyliomphalus compressus* Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 180, pl. 4, fig. 13.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 61, fig. 13.

Canadian (Beekmantown): Colchester, Vermont.

***Eccyliomphalus contiguus*** Ulrich.

*Eccyliomphalus contiguus* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1037, pl. 75, figs. 48–52.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 185, pl. 12, figs. 13–15.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

?Trenton: Jacksonburg, New Jersey.

*Cotypes*.—Cat. No. 45797, U.S.N.M.

***Eccyliomphalus distans*** (Billings).

*Eccyliomphalus distans* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 249, fig. 235.

*Eccyliomphalus distans* Miller, N. A. Geol. Pal., 1889, p. 403, fig. 672.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 663, fig. 915.

Chazy (Quebec—P.): Cow Head, Newfoundland.

**Eccyliomphalus fredericus** Raymond.

*Eccyliomphalus fredericus* Raymond, Bull. Amer. Pal., 3, 1902, p. 305, pl. 18, fig. 4; Ann. Carnegie Mus., 4, 1908, p. 202, pl. 53, figs. 1-3.

Chazyan: Crown Point, Valcour, etc., New York (Crown Point); Mingan Islands, Canada (Mingan).

**Eccyliomphalus gyroceras** (Roemer).

*Euomphalus gyroceras* Roemer, Kreide von Texas, 1852, pl. 11, figs. 6a, b, p. 91.

*Eccyliomphalus gyroceras* Miller, N. A. Geol. Pal., 1889, p. 403 (gen. ref.).

Canadian (Beekmantown): San Saba Valley, Texas.

**Eccyliomphalus intortus** (Billings).

*Eccyliomphalus intortus* Billings, Canadian Nat. Geol., 6, 1861, p. 320, fig. 5; Geol. Canada, Geol. Surv. Canada, 1863, p. 232, fig. 249.

Canadian (Beekmantown): Edwardstown, Phillipsburg, and Point Levis, Quebec.

**Eccyliomphalus kalmi** (Raymond).

*Eccyliopterus kalmi* Raymond, Ann. Carnegie Mus., 3, 1906, p. 576.

*Eccyliomphalus kalmi* Raymond, Ann. Carnegie Mus., 4, 1908, p. 202, pl. 53, fig. 4.

Chazyan (Crown Point): Sloop Bay, Valcour Island, New York.

**Eccyliomphalus (Orthostoma) lituiformis** (Whitfield).

*Calaurops lituiformis* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 315, pl. 26, figs. 1-4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 662, fig. 914.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 60, fig. 4.

*Eccyliomphalus (Calaurops) lituiformis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1023 (gen. ref.).

Canadian (Beekmantown): Fort Cassin, Vermont.

**Eccyliomphalus multiseptarius** (Cleland).

*Eccyliomphalus multiseptarius* Cleland, Bull. Amer. Pal., 3, 1900, p. 123 (251), pl. 15, figs. 1-4; Bull. Amer. Pal., 4, 1903, p. 17.

Canadian (Tribes Hill): Near Fort Hunter, New York.

**Eccyliomphalus perkinsi** (Whitfield).

*Euomphalus Perkinsi* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 30, pl. 1, figs. 10-14.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 56, figs. 6, 7.

*Eccyliomphalus perkinsi* Miller, 1st App. N. A. Geol. Pal., 1892, p. 693 (gen. ref.).

Canadian (Beekmantown): Fort Cassin, Vermont.

**Eccyliomphalus priscus** (Whitfield).

*Eccyliomphalus priscus* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 46, pl. 8, figs. 19, 20.

Canadian (Beekmantown): Near Beekmantown, New York.

**Eccyliomphalus proclivis** (Raymond).

*Eccyliopterus proclivis* Raymond, Ann. Carnegie Mus., 3, 1906, p. 576.

*Eccyliomphalus proclivis* Raymond, Ann. Carnegie Mus., 4, 1908, p. 203, pl. 53, fig. 5.

Chazyan (Crown Point): Crown Point, New York.

**Eccyliomphalus spiralis** (Billings).

*Eccyliomphalus spiralis* Billings, Canadian Nat. Geol., 6, 1861, p. 321.

Canadian (Beekmantown): Phillipsburg, Quebec.

**Eccyliomphalus subellipticus** Weller.

*Eccyliomphalus subelliptica* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 219, pl. 4, fig. 6.

Canadian (Beekmantown): Columbia, New Jersey.



**Eccyliomphalus subrotundus** Ulrich and Scofield.

*Eccyliomphalus subrotundus* Ulrich and Scofield; Geol. Minnesota, 3, pt. 2, 1897, p. 1037, pl. 75, figs. 17, 18.

Trenton (Prosser): Wykoff, Minnesota.

*Holotype*.—Cat. No. 45798, U.S.N.M.

**Eccyliomphalus superbus** (Billings).

*Eccyliomphalus superbus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 250.

Chazyan (Quebec—P): Portland Creek, Newfoundland.

**Eccyliomphalus trentonensis** (Conrad).

*Cyrtolites Trentonensis* Conrad, Jour. Acad. Nat. Sci., Philadelphia, 8, 1842, p.

270, pl. 17, fig. 4.—Hall, Pal. New York, 1, 1847, p. 189, pl. 40A, figs. 3a-d,

pl. 41, figs. 1a-c.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 167, pl. 5, fig.

22; fig. 38.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 183, figs.

*Eccyliomphalus* (?) *trentonensis* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 68 (gen. ref.).

*Eccyliomphalus trentonensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 184, pl. 12, figs. 20, 21.

Trenton: Carlisle, Pennsylvania; Middleville, etc., New York; New Jersey.

**ECCYLIOMPHALUS TRIANGULUS** Grabau and Shimer. See *Eccyliopterus triangulus*.

**Eccyliomphalus undulatus** (Hall).

*Eccyliomphalus undulatus* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 37.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 63, pl. 8, figs. 1-3.

*Eccyliomphalus undulatus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1036, pl. 75, figs. 19-23.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 663, fig. 916.

Black River (Platteville): Minneapolis, Minnesota; Beloit, Wisconsin; La Salle, Illinois; ?Lebanon, Tennessee (Stones River).

*Plesiotypes*.—Cat. Nos. 46054, 47927, U.S.N.M.

**ECCYLIOPTERUS** Remele.

Genotype: *Eccyliomphalus alatus* Roemer.

*Eccyliopterus* Remele, Zeitschr. deutsch. geol. Ges., Band, 40, 1888, p. 666.—

Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 318; Die Leitfossilien, Leipzig, 1896, p. 102; Bull. de l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 174.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897,

pp. 1029, 1031.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 658.

**Eccyliopterus beloitensis** Ulrich and Scofield.

*Eccyliopterus beloitensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1032, pl. 62, fig. 70; pl. 74, figs. 1-4.—Grabau and Shimer, N. A. Index

Fossils, 1, 1909, p. 658, fig. 906c-e.

Black River: Beloit, Wisconsin (Platteville); High Bridge, Kentucky (Lowville).

*Holotypes*.—Cat. No. 45799, U.S.N.M.

**Eccyliopterus disjunctus** (Billings).

*Ophileta?* *disjuncta* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 344, fig. 331a, b.

*Eccyliopterus disjuncta* Koken, Neues Jahrb. Min. Geol. Pal., 6, Beilage-Band, 1889, p. 320 (gen. ref.).

Canadian (Beekmantown): Leeds and Grenville Counties, Canada.

**ECCYLIOPTERUS KALMI** Raymond. See *Eccyliomphalus kalmi*.

**Eccyliopterus? michleranus** (Hall).

*Euomphalus michleranus* Hall, Rep. U. S. Mexican Bound. Surv., Emory, 1857, pl. 20, fig. 4.

Canadian (Beekmantown): Near El Paso, Texas.

*Holotype*.—Cat. No. 9825, U.S.N.M.

**Eccyliopterus ottawaensis** (Billings).

*Ophileta Ottawaensis* Billings, Canadian Nat. Geol., 5, 1860, p. 166, figs. 9, 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 180, fig. 173a., b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 500, figs.

*Eccyliopterus ottawaensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 937 (gen. ref.).

Trenton: Ottawa, Ontario.

**Eccyliopterus owenanus** (Meek and Worthen).

*Ophileta Owenana* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 313, pl. 3, fig. 6a, b.

*Eccyliopterus owenanus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1032, pl. 74, figs. 10-14.

*Eccyliopterus owenensis* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 658, fig. 906f, g.

Trenton: Galena, Illinois (Galena); Wykoff, etc., Minnesota (Prosser).

*Plesiotypes*.—Cat. No. 45800, 45801, U.S.N.M.

**ECCYLIPTERUS PROCLIVIS** Raymond. See *Eccyliomphalus proclivis*.

**Eccyliopterus spiralis** Ruedemann.

*Eccyliopterus spiralis* Ruedemann, Bull. New York State Mus., 49, 1901, p. 34, pl. 2, figs. 9, 10.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Eccyliopterus triangulus** (Whitfield).

*Eucomphalus triangulus* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 29, pl. 1, figs. 5-9.—Sardeson, Jour. Geol., 11, 1903, p. 481, fig. 18.

*Eccyliomphalus triangulus* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 663, fig. 917.

*Eccyliopterus triangulus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pl. 74, figs. 5, 6; pl. 62, fig. 73.

Canadian (Beekmantown): Providence Island, Lake Champlain, Vermont.

*Plesiotypes*.—Cat. No. 45802, U.S.N.M.

**Eccyliopterus vagrans** (Raymond).

*Helicotoma vagrans* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 376.

*Eccyliopterus vagrans* Raymond, Ann. Carnegie Mus., 4, 1908, p. 204, pl. 49, figs. 10-11.

Chazyan (Crown Point): Valcour Island, New York.

**Eccyliopterus volutatus** (Whitfield).

*Eucomphalus volutatus* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 314, pl. 25, figs. 8-11.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 59, figs. 8-10.

*Eccyliopterus volutatus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pl. 62, figs. 71, 72; pl. 74, figs. 7-9.

Canadian (Beekmantown): Fort Cassin, Vermont.

*Plesiotypes*.—Cat. No. 45803, U.S.N.M.

**ECHINOCRINUS FENESTRATUS** Yandell. See *Tetracystis fenestratus*.

**ECHINOCYSTIS** Hall. See *Lysocystites* Miller.



**ECHINOCYSTITES** Hall. See *Lysocystites* Miller.

**ECHINOENCRINITES ANATIFORMIS** Hall. See *Chirocrinus anatiformis*.

**ECHINOENCRINITES FENESTRATUS** Troost. See *Tetracystis fenestratus*.

**ECHINOGNATHUS** Walcott. Genotype: *Eurypterus? clevelandi* Walcott.

*Echinognathus* Walcott, Amer. Jour. Sci., 3d ser., 23, 1882, p. 213.—Zittel, Handb. Pal., 2, 1885, p. 651.—Miller, N. A. Geol. Pal., 1889, p. 546.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 18.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 676; 2d ed., 1913, p. 783.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 321.

*Echinorhynchus* (in error for *Echinognathus*) Martin, Trans. New York Acad. Sci., 2, 1882, p. 8.

**Echinognathus clevelandi** (Walcott).

*Eurypterus? clevelandi* Walcott, Amer. Jour. Sci., 3d ser., 23, 1882, p. 153, figs. 1, 2.

*Eurypterus* (*Echinognathus*) *clevelandi* Laurie, Trans. Royal Soc. Edinburgh, 39, 1899, p. 587.

*Echinognathus clevelandi* Walcott, Amer. Jour. Sci., 3d ser., 23, 1882, p. 213, figs. 1, 2.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 322, pl. 58, figs. 1, 2.

Utica: Holland Patent, Oneida County, New York.

*Cotypes*.—Cat. No. 26785, U.S.N.M.

**ECHINORHYNCHUS** Martin. See *Echinognathus* Walcott.

**ECHINOSPHERA** Angelin. See *Echinosphærites* Eichwald.

**ECHINOSPHERITES** Wahlenberg. Genotype: *Echinus aurantium* Gyllenhal.

*Echinosphærites* Wahlenberg, Acta Soc. Sci. Upsala, 8, 1821, p. 52.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 231.—Muller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 248.—Chapman, Canadian Jour., new ser., 2, 1857, p. 303.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 302.—Hall, Pal. New York, 3, for 1859, 1861, p. 150.—Zittel, Handb. Pal., 1, 1879, p. 417.—Barrande and Waagen, Syst. Sil. Centre Boheme, 7, pt. 1, 1887, p. 150, pls. 16, 21-25, 39.—Jaekel, Stammes. Pemat., 1, Thecoidea u. Cyst., Berlin, 1899, p. 331.—Zittel-Eastman Textb. Pal., 1, 1900, p. 183.

*Echinosphæra* Angelin, Icon. Crinod., 1878, p. 28.—Haeckel, Amph. Cyst. Leipzig, 1896, p. 66, pl. 1, figs. 3-3E.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 53, figs. 14, 15.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 152.

**Echinosphærites aurantium** (Gyllenhal).

*Echinus aurantium* Gyllenhal, Kong. Vet. Akad. Hand., 33, 1772, p. 245, pl. 8, figs. 4, 5; pl. 9, figs. 6-9.—Wahlenberg, Jour. de Physique, 91, 1820, p. 188.

*Echinosphærites aurantium* Wahlenberg, Acta Soc. Sci. Upsala, 8, 1821, p. 52.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 3, fig. 19; pl. 21, figs. 6-8.

*Sphæronites aurantium* Hisinger, Anteckninger, 4, 1828, pp. 195, 198.

*Echinosphæra aurantium* Angelin, Iconog. Crin. Soc., 1878, p. 28, pl. 14, figs. 1-21.

*Crystallocystis aurantium* Haeckel, Die Amph. und Cyst., 1896, p. 66, pl. 1, figs. 3-3e.

Middle Ordovician: Esthonia, Russia; Pennsylvania, Maryland, and Virginia (Chambersburg); Virginia and Tennessee (Ottosee); Tennessee (Carters); Missouri, etc. (Kimmswick).

*Plesiotypes*.—Cat. No. 56631, U.S.N.M.

*ECHINUS AURANTIUM* Wahlenberg. See *Echinosphærites aurantium*.

*ECHINUS GYRACANTHUS* Eaton. See *Tentaculites gyracanthus*.

**ECTENOCRINUS** Miller.

Genotype: *Heterocrinus simplex* Hall.

*Ectenocrinus* Miller, N. A. Geol. Pal., 1889, p. 242.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 7; pl. 15, fig. 7.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1890, pp. 380, 383, 385.—Bather, Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 20; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 146, fig. 58, 3.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Zittel, Grundzuge Pal., 1, 1910, p. 151.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 27; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 212.

**Ectenocrinus canadensis** (Billings).

*Heterocrinus Canadensis* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 273; Geol. Surv. Canada, dec. 4, 1859, p. 48, pl. 4, figs. 5a-5d.

*Ectenocrinus canadensis* Miller, N. A. Geol. Pal., 1889, p. 242 (gen. ref.).—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 22, pl. 4, fig. 10.

*Heterocrinites simplex* Troost, Amer. Assoc. Adv. Sci., 1850, p. 60 (nom. nud.).

Trenton: Ottawa and Montreal, Canada; Frankfort, Kentucky.

*Plesiotype*.—Cat. No. 39921, U.S.N.M. (Troost's type of *H. simplex*.)

**Ectenocrinus grandis** (Meek).

*Heterocrinus simplex* var. *grandis* Meek, Geol. Surv. Ohio, Pal., 1843, p. 9, pl. 1, figs. 7a-c; Cincinnati Quart. Jour. Sci., 1, Jan., 1874, p. 13.

*Ectenocrinus grandis* Miller, N. A. Geol. Pal., 1889, p. 242, fig. 295.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 124, pl. 1, figs. 8a-d.

*Heterocrinus simplex* Hall (not Hall, 1847), 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 5, fig. 11, 12.

Eden and Lower Maysville: Cincinnati, Ohio, and vicinity.

Trenton (Upper): Near Rogers Gap, Kentucky.

**Ectenocrinus simplex** (Hall).

*Heterocrinus simplex* Hall, Pal. New York, 1, 1847, p. 280, pl. 76, figs. 2a-d.—Billings, Geol. Surv. Canada, Rep. Prog., 1853-56, 1857, p. 271.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 7, pl. 1, figs. 4a, b, 5a, b.—Dyche, Science, 20, 1892, p. 66; Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 101.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 502, fig. 1814.

*Ectenocrinus simplex* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1880, p. 392, pl. 10, fig. 9.—Miller, N. A. Geol. Pal., 1889, p. 242, fig. 296.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 720, pl. 4, figs. 10, 10a.

*Ectenocrinus* (*Heterocrinus*) *simplex* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 42, 1890, p. 379.

Eden and Lower Maysville: Cincinnati, Ohio, and vicinity.

**ECTOMARIA** Koken.

Genotype: *Murchisonia nieszkowskii* Schmidt.

*Eunema* (part) of Salter, Billings, Bigsby and Miller.

*Murchisonia* (part) of Whitfield and other authors.

*Solenospira* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pp. 959, 1021.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 635 (Genotype: *Eunema pagoda* Salter).

*Ectomaria* Koken, Bull. Acad. Imp. Sci. St. Petersburg, 5th ser., 7, No. 2, 1897, p. 201; Koken, Die Leitfossilien, 1896, p. 395; Neues Jahrb. für Min., Geol. und Pal., 1, 1898, p. 21.—Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 252.



**Ectomaria adelina** (Billings).

Murchisonia Adelina Billings, Pal. Foss., 1, Geol. Surv. Canada, p. 232, fig. 217.  
 Solenospira adelina Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1021 (gen. ref.).  
 Ectomaria adelina Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253 (gen. ref.).

Canadian (Quebec-G): Cape Norman, Newfoundland.

**Ectomaria? extenuata** (Hall).

Murchisonia extenuata Hall, Pal. New York, 3, 1859, p. 298, pl. 54, figs. 15, 16.  
 Solenospira? extenuatum Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 176, pl. 16, fig. 7.

Cayugan (Manlius): Schoharie and Onondaga Counties, New York.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

**Ectomaria minuta** (Hall).

Murchisonia minuta Hall, Pal. New York, 3, 1859, p. 298, pl. 54, fig. 17.  
 Solenospira minuta Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 175, pl. 16, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 653.

Cayugan (Manlius): Fayetteville, New York.

Monroan: Monroe County (Raisin River) and Detroit, Michigan (Lucas).

**Ectomaria missisquoi** (Billings).

Murchisonia missisquoi Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 307.  
 Solenospira missisquoi Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1021 (gen. ref.).  
 Ectomaria missisquoi Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253 (gen. ref.).

Canadian (Beekmantown): Stanbridge, Quebec.

**Ectomaria pagoda** (Salter).

Eunema? pagoda Salter, Geol. Surv. Canada, Canadian Org. Rem., dec. 1, 1859, p. 30, pl. 6, fig. 5.

Murchisonia pagoda Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.

Solenospira pagoda Ulrich and Scofield, Geol. Minnesota 3, pt. 2, 1897, p. 1022, pl. 70, figs. 56-60.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 653, fig. 893d, e.

Ectomaria pagoda Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253.

Black River: Pauquettes Rapids, Ottawa River, Canada, and near Watertown, New York (Leray); Cannon Falls, Minnesota (Decorah); Beloit, Wisconsin (Platteville).

*Plesiotype*.—Cat. No. 45997, U.S.N.M. (Ulrich and Scofield).

**Ectomaria pagoda occidentalis** (Whiteaves).

Solenospira pagoda var. occidentalis Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 193.

Ectomaria pagoda var. occidentalis Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1899, p. 244 (gen. ref.).

Black River or Richmond: Little Black Island, Lake Winnipeg.

**Ectomaria prisca** (Billings).

Eunema prisca Billings, Canadian Nat. and Geol., 4, 1859, p. 360, fig. 8, 1; Geol. Surv. Canada, 1863, p. 119, fig. 30.

Solenospira prisca Ulrich and Scofield, Geol. Minnesota, pt. 2, 1897, p. 1022, pl. 70, figs. 52-55.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 653, fig. 893c.

Ectomaria prisca Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253 (gen. ref.).

**Ectomaria prisca**—Continued.

Murchisonia (Eunema) pagoda Whitfield (not Salter), Geol. Wisconsin, 4, 1883, p. 218, pl. 5, fig. 20.

Chazy (Mingan): Mingan Islands, Canada.

Black River: Beloit and Janesville, Wisconsin; Minneapolis, Minnesota; Dixon, Illinois.

*Plesiotype*.—Cat. Nos. 46072, 46073, U.S.N.M. (Ulrich and Scofield).

**Ectomaria prisca extenuata** Ulrich.

Solenospira prisca var. extenuata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1022, pl. 70, figs. 52, 54.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Holotype*.—Cat. No. 46074, U.S.N.M.

**EDMONDIA** Koninck.

Genotype: Isocardia unioniformis Phillips.

Edmondia Koninck, Desc. Animaux Fossiles, Liege, 1842-1844, p. 66.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 162.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 501.—Zittel, Handb. Pal., 2, 1881, p. 127.—Hall, Pal. New York, 5, pt. 1, Lam., 2, 1885, p. XXXII.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 11, 1885, p. 28.—Miller, N. A. Geol. Pal., 1889, p. 478.—Hind, Mon. British Carb. Lam., 1, Pal. Soc., 1898, p. 255.

**Edmondia?? arcuata** Cleland.

Edmondia(?) arcuata Cleland, Bull. Amer. Pal., 4, 1903, p. 18, pl. 4, figs. 5-7.

Canadian? (Beekmantown?): Three miles south Ingham Mills, New York.

Observation.—Probably a synonym for some species from the Stones River or higher formation.

**Edmondia? deckerensis** Weller.

Edmondia? deckerensis Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 241, pl. 22, figs. 6-7.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

**Edmondia? nilesi** Winchell and Marcy.

Edmondia Nilesi Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 97, pl. 2, fig. 13.

Modiolopsis nilesi Whitfield, Geol. Wisconsin, 4, 1882, p. 357 (gen. ref.).

Niagaran (Racine); Chicago, Illinois; Wisconsin.

**EDMONDIA SUBANGULATA** Hall. See *Cyrtodonta subangulata*.

**EDMONDIA SUBTRUNCATA** Hall. See *Whitella subtruncata*.

**EDMONDIA VENTRICOSA** Hall (part). See *Whitella ventricosa*.

**Edmondia? vetusta** Whiteaves.

Edmondia? vetusta Whiteaves, Geol. Surv. Canada, Pal., Foss., 3, p. 187, pl. 20, fig. 8.

Black River or Richmond: Inmost Island, Kinnow Bay, Lake Winnipeg.

**EDRIOASTER** Billings.

Genotype: Cyclaster bigsbyi Billings.

Cyclaster Billings (preoccupied), Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 292; Geol. Surv. Canada, Canadian Org. Rem., dec. 3, 1858, p. 82.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 323.—Zittel, Grundzuge Pal., 1, 1910, p. 241.



**EDRIOASTER**—Continued.

Edrioaster Billings, Geol. Surv. Canada, dec. 3, 1858, p. 82.—Zittel, Handb. Pal., 1, 1879, p. 414.—Sturtz, Neues Jahrb. Min., Geol. Pal., 2, 1886, p. 144.—Miller, N. A. Geol. Pal., 1889, p. 242.—Jaekel, Stammes. d. Pelmat, 1, Thecoidea u. Cyst., Berlin, 1899, p. 44.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 209, fig. 6.—Zittel, Grundzuge Pal., 1, 1910, p. 181.

Edriocystis Haeckel, Amph. und Cyst., Leipzig, 1896, p. 117.

**Edrioaster bigsbyi** (Billings).

Cyclaster Bigsbyi Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 293.

Agelacrinites (Edrioaster) Bigsbyi Chapman, Expos. Min. Geol., Canada, 1864, p. 110.—Sladen, Quart. Jour. Geol. Soc., 35, 1879, p. 750.

Agelacrinus Bigsbyi Schmidt, Mem. Acad. St. Petersburg, 22, No. 11, 1874, 34.

Edriocystis Bigsbyi Haeckel, Amph. u. Cyst., 1896, p. 118, pl. 3, figs. 35, 36.

Edrioaster Bigsbyi Billings, Geol. Surv. Canada (Can. Org. Rem.), dec. 3, 1858, p. 85, pl. 8, figs. 1, 1a, 2, 2a.—Jaekel, Stammes. d. Pelmat., 1, Thecoidea u. Cyst., Berlin, 1899, p. 46, pl. 2, fig. 4.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 209, fig. 6.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 44 (loc. occ.).

Trenton: Ottawa and Kirkfield, Ontario; High Bridge, Kentucky (Curdsville); Fillmore County, Minnesota (Prosser.).

**Edrioaster saratogensis** Ruedemann.

Edrioaster saratogensis Ruedemann, Bull. New York State Mus., 162, 1912, p. 86, pl. 3, figs. 2–4.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

**EDRIOCYSTIS** Haeckel. See *Edrioaster* Billings.

**EDRIOSPONGIA** Ulrich and Everett. Genotype: *E. basalis* Ulrich and Everett.

Edriospongia Ulrich and Everett in Miller, N. A. Geol. Pal., 1889, p. 159.—Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 271.

**Edriospongia basalis** Ulrich and Everett.

Edriospongia basalis Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 272, pl. 6, figs. 1a–c.

Black River (Platteville): Near Dixon, Illinois.

Sections of *holotype*.—Cat. No. 46556, U.S.N.M.

**EICHWALDIA** of authors. See *Dictyonella* Hall.

**EICHWALDIA** Billings.

Genotype: *E. subtrigonalis* Billings.

Eichwaldia Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 190; Canadian Nat. Geol., 3, 1858, p. 442.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 81; Zittel-Eastman Textb. Pal., 1, 1900, p. 312; *ibid.*, 2d ed. 1913, p. 396.

**Eichwaldia subtrigonalis** Billings.

Eichwaldia subtrigonalis Billings, Geol. Surv. Canada; Rep. Progr. for 1857, 1858, p. 192, fig. 24; Canadian Nat. Geol., 3, 1858, p. 443, fig. 24; Geol. Canada, 1863, p. 142, fig. 76.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 310, figs. 241, 242; pl. 83, figs. 1–4.

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

**ELKANIA** Ford.Genotype: *Obolella desiderata* Billings.*Billingsia* Ford (not Dekoninck, 1876), Amer. Jour. Sci., 3d ser., 31, 1885, p. 466.*Elkania* Ford, Amer. Jour. Sci., 3d ser., 32, 1886, p. 325.—Miller, N. A. Geol. Pal., 1889, p. 346.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 75, 165; 11th Ann. Rep. New York State Geologist, 1894, p. 241.—Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 321.**Elkania ambigua** (Walcott).*Obolella?* *ambigua* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 67, pl. 1, fig. 2.*Billingsia?* *ambigua* Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 467.*Elkania ambigua* Ford, Amer. Jour. Sci., 32, 1886, p. 325.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 78.—Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 562, pl. 51, figs. 2, 2a-c.

Lower Pogonip: Northeast of Adams Hill and southeast of Jackson Mine, Eureka District, Eureka County, Nevada.

*Holotype* and *plesiotype*.—Cat. No. 24554, U.S.N.M.**Elkanla desiderata** (Billings).*Obolella desiderata* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1862, p. 69, fig. 62 on p. 68.—Davidson, Geol. Mag., 5, p. 309, figs. 1, 2.—Walcott, Bull. U. S. Geol. Surv., 30, p. 111.*Billingsia desiderata* Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 466, figs. 1, 2.*Elkania desiderata* Ford, Amer. Jour. Sci., 32, 1886, p. 325.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 77, pl. 3, figs. 15-19; 11th Ann. Rep. State Geol. New York, 1892, pl. 3, figs. 13-14.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 221.—Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 562, pl. 51, figs. 1, 1a-d.Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.**Elkanta ida** (Billings).*Obolella ida* Billings, Pal. Fossils, Geol. Surv. Canada, 1, 1865, p. 71, fig. 63 (adv. sheets, 1862).—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 111.—Dawson, Canadian Rec.

Sci., 3, 1888, p. 55; Peter Redpath Mus., McGill Univ., 1888, p. 55.

*Billingsia?* *ida* Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 467.*Elkania ida* Ford, Amer. Jour. Sci., 32, 1886, p. 325 (gen. ref.).—Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 563, pl. 30, figs. 20, 20a; pl. 51, figs. 4, 4a-c. Ozarkian? (Levis-erratics): Point Levis, Quebec.**ELKANIA PRETIOSA** Ford. See *Acrothete pretiosa*.**ELLIPTOCEPHALA UNDULOSTRIATA** Miller. See *Proetus undulostriatus*.**ELPE** Barrande.Genotype: *E. inchoata* Barrande.*Elpe* Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 510.—Zittel, Handb. Pal., 2, 1885, p. 554.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 646.—Bassler, *ibid*, 2d ed., 1913, p. 741.*Leioditia* (Ulrich MS.) Jones, Geol. Surv. Canada, Cont. Micro-Pal., 3, 1891, p. 94.**Elpe cincinnatiensis** (Meek).*Cythere cincinnatiensis* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 331; Geol. Surv. Ohio, Pal., 1, 1873, p. 158, pl. 14, figs. 1a-d.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 120.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 395, footnote.*Cytheropsis cincinnatiensis* Miller, N. A. Geol. Pal., 1889, p. 541, fig. 993.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.



**Elpe irregularis** (Miller).

*Cythere irregularis* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 106, pl. 3, figs. 7, 7a.

*Cytheropsis irregularis* Miller, N. A. Geol. Pal., 1889, p. 541 (gen. ref.).

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**Elpe radiata** (Ulrich).

*Leperditia radiata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 9, pl. 7, figs. 2-2b.

Eden (Fulton): First Ward, Cincinnati, Ohio.

*Cotypes*.—Cat. No. 41711, U.S.N.M.

**Elpe ulrichi** Foerste.

*Elpe Ulrichi* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 532, pl. 37, figs. 14a-c.

Upper Medinan (Brassfield): Huffman's Quarry, near Dayton, Ohio.

**EMMELEZOE** Jones and Woodward.

Genotype: *Ceratiocaris elliptica* Jones.

*Emmelezoe* Jones and Woodward, Mon. British Pal. Phyllopoda, Pal. Soc., 1888, pp. 3, 68.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 657; 2d ed., 1913, p. 752.

**Emmelezoe decora** Clarke.

*Emmelezoe decora* Clarke, 54th Ann. Rep. New York State Mus., App. 1, 1902, p. 95, pl. 2, figs. 4-11; pl. 3, figs. 1-4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 379, fig. 1683.

Cayugan (Pittsford): Erie Canal, Monroe County, New York.

**EMMONSIA** Edwards and Haime. See *Favosites* Lamarck.**EMPEROCRINUS** Miller and Gurley.

Genotype: *E. indianensis* Miller and Gurley.

*Emperocrinus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 42.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 744.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 202.

**Emperocrinus indianensis** Miller and Gurley.

*Emperocrinus indianensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 43, pl. 4, figs. 16, 17.—Miller, N. A. Geol. Pal., 2d App., p. 744, figs. 1347, 1348.

Niagaran (Laurel): St. Paul, Indiana.

**Enallopora** D'Orbigny.

Genotype: *Gorgonia perantiqua* Hall.

*Enallopora* D'Orbigny, Prod. de Pal., 1, 1850, p. 22.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 206.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 169.—Miller, N. A. Geol. Pal., 1889, p. 300.

Observations.—For objections to the use of this name, see Geol. Surv. Illinois, 8, p. 683.

**ENALLOPORA CINCTOSA** Miller. See *Mitoclema cinctosum*.**ENALLOPORA PERANTIQUA** D'Orbigny. See *Protocrisina perantiqua*.**ENCRINASTER** Haeckel (part). See *Protaster* Forbes.**ENCRINURUS** Emmrich.

Genotype: *Trilobus punctatus* Brunn.

*Cryptonymus* Eichwald, (not Eichwald, 1825), Sil. Schichten Syst., Esthland, 1840.—Salter, Mon. British Tril., Pal. Soc., 1866, pp. 147, 168.—Angelin, Pal. Scandinavica, 3d ed., Holmiæ, 1878, p. 2.

**ENCrinURUS**—Continued.

- Encrinurus* Emmrich, *Zur. Natg. der Tril.*, 1844, p. 16; *Neues Jahrb. f. Min., etc.*, 1845, p. 42.—Hawle and Corda, *Abh. d. k. böhmischen Gesell. d. Wiss.*, 5 (ext.), 1847, p. 90, pl. 5, fig. 55.—Barrande, *Neues Jahrb. f. Min., etc.*, 1850, p. 778.—Salter, *Mem. Geol. Surv. United Kingdom*, dec. 3, 1853, pl. 4.—McCoy, *British Pal. Rocks Fossils*, 1854, p. 158.—Pictet, *Traité de Pal.*, 2d ed., 2, 1854, p. 523.—Nieszkowski, *Archiv. f. Naturk. Liv-, Ehst- u. Kurl.*, 1, 1857; p. 602.—Steinhardt, *Beit. z. Naturk. Preus. Phys.-Oekon. Gesell. Königsberg*, 1874, p. 57.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7th ser., 30, 1881, p. 222.—Zittel, *Handb. Pal.*, 2, 1885, p. 621.—Novak, *Sitzb. d. k. böhm. Gesell. d. Wiss. Math. Naturw. Cl. for 1886*, p. 429.—Miller, *N. A. Geol. Pal.*, 1889, p. 547.—Koken, *Die Leitfossilien*, Leipzig, p. 36, 1896, fig. 24, figs. 5, 6.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 105, pl. 3, fig. 25.—Jaekel, *Zeits. d. d. geol. Gesell.*, 53, 1901, p. 149.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 225; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 225.—Lindstrom, *Kongl. Sven. Vet. Akad. Handl.*, 34, No. 8, 1901, p. 26, 56.—Vogdes, *San Diego Soc. Nat. Hist.*, 1907, p. 61.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 314.—Slocum, *Field Mus. Nat. Hist., Geol. Ser.*, 4, 1913, p. 61.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 723.
- Cromus* Barrande, *Syst. Sil. du Centre Boheme*, 1, 1852, p. 821, pl. 43.—Zittel, *Handb. Pal.*, 2, 1885, p. 621.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 36.—Jaekel, *Zeits. d. d. geol. Gesell.*, 53, 1901, p. 156.—Lindstrom, *Kongl. Sven. Vet. Akad. Handl.*, 34, No. 8, 1901, p. 11.—Pictet, *Traité de Pal.*, 2d ed., 2, 1854, p. 523.—Barrande, *Syst. Sil. du Centre Boheme*, Suppl., 1, 1872, p. 20.

***Encrinurus americanus* Vogdes.**

- Encrinurus americanus* Vogdes, *Desc. New Crust. Clinton of Georgia*, 1886, p. 1.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 2, 1887, p. 102.  
Clinton: Taylors Ridge, west of Catoosa Station, Georgia.

***Encrinurus cristatus* Clarke.**

- Encrinurus cristatus* Clarke, *Geol. Minnesota*, 3, pt. 2, 1894, p. 741, fig. 58.  
Richmond (Maquoketa): Spring Valley, Minnesota.  
*Holotype*.—Cat. No. 41953, U.S.N.M.

***Encrinurus deltoideus* Shumard.**

- Encrinurus deltoideus* Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, pt. 2, 1855, p. 198, pl. B, fig. 10.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 2, pt. 1, 1887, p. 102.—Keyes, *Missouri Geol. Surv.*, 4, 1894, p. 229.—Savage, *Bull. Geol. Surv., Illinois*, 23, 1913, p. 60, pl. 2, fig. 10.  
*Cryptonymus deltoideus* Vogdes, *Mon. Genera Zethus, Cybele, Encrinurus and Cryptonymus*, 1878, p. 21.  
Upper Medinan (Girardeau): Near Thebes, Illinois.

***Encrinurus egani* Miller.**

- Encrinurus egani* Miller, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1880, p. 254, pl. 15, figs. 1, 1b; *N. A. Geol. Pal.*, 1889, p. 547, figs. 1004–5.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 2, 1907, p. 257, pl. 24, figs. 8–11.  
Niagaran (Racine): Joliet and near Lemont, Illinois.

***Encrinurus elegantulus* Billings.**

- Encrinurus elegantulus* Billings, *Cat. Sil. Foss. Anticosti, Geol. Surv. Canada*, 1866, p. 62.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 2, pt. 1, 1887, p. 102.  
Anticostian (Jupiter River): The Jumpers, Anticosti.



*Encrinurus excedrurus* Safford. See *Encrinurus raricostatus*.

***Encrinurus indianensis* Kindle and Breger.**

*Encrinurus indianensis* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1904, p. 482, pl. 24, figs. 14, 15.

Niagaran (Noblesville): Connors Mill, Huntington, Wabash, etc., Indiana.

***Encrinurus laevis* (Angelin).**

*Cryptonymus laevis* Angelin, Pal. Scand., pt. 1, p. 4, pl. 4, fig. 10.

*Encrinurus* (*Cryptonymus*) *laevis* Salter, Sutherland's Jour. Voyage in Baffins Bay, etc., 2, App., 1852, p. 221, pl. 5, figs. 14, 14a.

*Encrinurus laevis* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 592.

*Cromus arcticus* Houghton, Jour. Geol. Soc. Dublin, 1, 1857, p. 241, pl. 6, figs. 1-5.

Niagaran: Griffiths Island, etc., Arctic America.

*ENCINURUS MIRUS* Billings. See *Cybeloides mirus*.

***Encrinurus multisegmentatus* (?Portlock) Billings.**

*Amphion multisegmentatus* Portlock, Geol. Londonderry, 1843, p. 291, pl. 3, fig. 6.

*Encrinurus multisegmentatus* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 61 (loc. ref.).—Salter, Mem. Geol. Surv. United Kingdom, decade 7, pl. 4.

*Cryptonymus multisegmentatus* Vogdes, Mon. Genera Zethus, etc., 1878, p. 29.

Richmond (English Head and Ellis Bay): Junction Cliff, Anticosti.

***Encrinurus nereus* Hall.**

*Encrinurus* sp. Hall, adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 30; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 334.

*Encrinurus nereus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 375, pl. 21, fig. 15; rev. ed., 1870, p. 425, pl. 21, fig. 15.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 102.

*Cryptonymus nereus* Vogdes, Mon. Gen. Zethus, Cybele, etc., 1878, p. 24, pl. 3, fig. 17.

Niagaran (Racine): Racine, Wisconsin.

***Encrinurus ornatus* Hall and Whitfield.**

*Cybele punctata* Hall (not Brönnich), Pal. New York, 2, 1852, p. 297, pl. 66A, figs. 1a-1.

*Encrinurus punctatus* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 61 (loc. ref.).—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1897, p. 103; Proc. Boston Soc. Nat. Hist., 24, 1890, p. 269.—Van Ingen, School of Mines Quart., 1901, p. 66, pl. fig. 27.

*Encrinurus* cfr. *punctatus* Norton, Proc. Iowa Acad. Sci., 3, 1896, p. 79.

*Encrinurus ornatus* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 154, pl. 6, fig. 16.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 102.—Grabau, Bull. New York State Mus., 45, 1901, p. 225, fig. 157; Bull. Buffalo Soc. Nat. Hist., 7, p. 225, fig. 157.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 314, fig. 1627.

*Cryptonymus ornatus* Vogdes, Mon. Gen. Zethus, Cybele, etc., 1878, p. 23.

Niagaran (Clinton-Guelph): Eaton and Yellow Springs, Ohio; New York; Canada; Arkansas; Tennessee; Alabama.

***Encrinurus pernodosus* Slocum.**

*Encrinurus pernodosus* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 61, pl. 16, figs. 5-7.

Richmond (Maquoketa): Bloomfield, Clermont, and Elgin, Iowa.

*Encrinurus punctatus* Foerste. See *Encrinurus thresheri* and *E. ornatus*.

***Encrinurus rariocostatus* Walcott.**

*Encrinurus excedrinus* Safford, Geol. Tennessee, 1869, p. 290 (nom. nud.).

*Encrinurus rariocostatus* Walcott, 31st Rep. New York State Mus. Nat. Hist., 1880 (adv. sheets, 1877), p. 69.—Safford and Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1889, p. 167, text fig.—Clarke, Geol. Minnesota, 3, pt. 2, 1890, p. 740.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 128.

*Cryptonymus rariocostatus* Vogdes, Mon. Genera Zethus, etc., 1878, p. 27.

Black River: Mineral Point, Beloit, and Janesville, Wisconsin (Platteville); Manitoba.

***Encrinurus rarus* (Walcott).**

*Ceraurus rarus* Walcott, 31st Rep. New York State Mus. Nat. Hist., 1880 (adv. sheets, 1877), p. 68.

*Ceraurus* (*Cyrtometopus*) *rarus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738.

*Encrinurus rarus* Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 541, pl. 2, fig. 3.

Black River (Platteville): Beloit, Wisconsin.

Observation.—See *E. vannulus* Clarke.

***Encrinurus thresheri* Foerste.**

*Encrinurus thresheri* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 101, pl. 8, fig. 26.

*Encrinurus punctatus* Foerste, Geol. Surv. Ohio, 7, 1893, p. 531, pl. 27, fig. 26.

Upper Medinan (Brassfield): Dayton, Ohio; Hanover, Indiana.

***Encrinurus trentonensis* Walcott.**

*Encrinurus trentonensis* Walcott, 31st Rep. New York State Mus. Nat. Hist., 1880 (adv. sheets, 1877), p. 68.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 202, pl. 15, figs. 26, 27.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 314.

*Cryptonymus trentonensis* Vogdes, Mon. Genera Zethus, etc., 1878, p. 28.

Black River: Clifton, Wisconsin; Dunleith, Illinois.

Trenton: Jacksonburg, New Jersey.

***Encrinurus tuberculifrons* Weller.**

*Encrinurus tuberculifrons* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 259, pl. 24, figs. 12–13.

Niagaran (Racine): Near Joliet, Illinois.

***Encrinurus tuberculosus* Collie.**

*Encrinurus tuberculosus* Collie, Bull. Geol. Soc. Amer., 14, 1903, p. 418, pl. 59, fig. 3.

Trenton: Bellefonte, Pennsylvania.

***Encrinurus vannulus* Clarke.**

*Encrinurus vannulus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 739, figs. 56, 57.

Black River (Platteville): Janesville and Beloit, Wisconsin.

*Cotype*.—Cat. No. 41954, U.S.N.M.

Observation.—Probably the same as *E. rarus* Walcott.

***Encrinurus vigilans* (Hall).**

*Ceraurus vigilans* Hall, Pal. New York, 1, 1847, p. 245, pl. 65, figs. 2a–h.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 217, pl. 15, figs. 2a–c.

*Cryptonymus vigilans* Vogdes, Mon. Genera Zethus, etc., 1878, p. 29, pl. 2, figs. 2a–2h.



**Encrinurus vigilans**—Continued.

*Encrinurus vigilans* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 952 (gen. ref.).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 216, figs.

*Cybele vigilans* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67 (gen. ref.).

Trenton: Middleville, etc., New York.

**Encrinurus curvatus** Eaton.

*Encrinurus curvatus* Eaton, Geol. Textb., 2d ed., 1832, p. 128, pl. 1, fig. 4.

Ordovician: Glens Falls, New York.

Observation.—Species based on a crinoid column.

**ENCINURUS GIGANTEUS** Eaton. See *Arthropycus alleghaniensis*.

**ENCINURUS TRANSVERSUS** Eaton. See *Phytopsis tubulosa*.

**ENDOCERAS** Hall.

Accepted genotype: *E. proteiforme* Hall.

*Endoceras* Hall, Amer. Jour. Sci. Arts, 47, 1844, p. 109; Pal. New York, 1, 1847, p. 58, p. 207 footnote.—Roemer, Neues Jahrb. f. Min., etc., 1848, p. 178.—Woodward, Man. Mollusca, pt. 1, 1851, p. 89, fig. 50 on p. 90.—Saemann, Palæontographica, 3, 1852, pp. 147, 155, 157, 162.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 641.—Emmons, Amer. Geol., 1, pt. 2, 1855, pp. 148, 151.—Barrande, Bull. Soc. Geol. France, 2d, 12, 1855, p. 172; Neues Jahrb. f. Min., etc., 1855, p. 274, pl. 3, figs. 16, 71, p. 385.—Salter, Quart. Jour. Geol. Soc. London, 15, 1859, p. 376, fig. b.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 68.—Hitchcock, Geol. Vermont, 1, for 1861, 1862, p. 299.—Chapman, Canadian, Jour., n. s., 8, 1863, p. 21; Expos. Min. Geol. Canada, 1864, p. 129.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 773.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 130.—Barrande, Cephalopodes, Ext. Syst. Sil. du Centre Boheme, p. 103.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, pp. 20, 23, fig. 1; Geol. Wisconsin, 4, 1882, p. 228.—Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 85.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 266.—Zittel, Handb. Pal., 2, 1884, p. 362.—Holm, Palæont. Abhandl., Dames and Kayser, Bd. 3, Heft 2, 1885, pp. 4, 11.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 129.—Miller, N. A. Geol. Pal., 1889, p. 436.—Hyatt, Amer. Geol., 16, 1895, July, p. 1.—Koken, Die Leitfossilien, Leipzig, 1896, p. 48, fig. 30.—Holm, Geol. Foren Stockholm Forhandl., 18, 1896, p. 395; Sveriges Geol. Unders., ser. C, No. 163, 1896, p. 3.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 514; 2d ed., 1913, p. 595.—Ruedemann, Amer. Geol., 31, 1903, p. 214; Bull. New York State Mus., 90, 1906, pp. 404, 418.—Cumings, 32d Ann Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1026.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 41.

*Diploceras* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1847, p. 267.—Whitfield, Geol. Wisconsin, 4, 1882, p. 228 (Genotype: *D. vanuxemi* Conrad).

*Cyclendoceras* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 43.

*Colpoceras* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 181; doc. ed., p. 174.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 783.—Miller, N. A. Geol. Pal., 1889, p. 432 (Genotype: *C. virgatum* Hall).

Observation.—The generic relations of the species here referred to *Endoceras* and also to *Cameroceras* are in many cases still to be investigated.

**Endoceras angusticameratum** Hall.

*Endoceras angusticameratum* Hall, Pal. New York, 1847, p. 218, pl. 51, fig. 3.

Trenton: Middleville, New York.

**Endoceras annulatum** Hall.

Endoceras annulatum Hall, Pal. New York, 1, 1847, p. 207, pl. 44, figs. 1a, b; Amer. Geol., 1, pt. 2, 1855, p. 152.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 243.

Endoceras annulatum var. Whiteaves, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 77, pl. 5, figs. 1, 1a; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 202.

Cyclendoceras annulatum Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 43, fig. 1241.

Trenton: Watertown, New York; Lake Winnepeg, Canada.

ENDOCERAS APPROXIMATUM Hall. See Cameroceras approximatum.

**Endoceras arctiventrum** Hall.

Endoceras arctiventrum Hall, Pal. New York, 1, 1847, p. 217, pl. 51, figs. 2a, b. Trenton: Middleville, New York.

**Endoceras arcuatum** (J. F. James).

Colpoceras arcuatum James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 242, pl. 4, figs. 1a, b.

Maysville: Cincinnati, Ohio.

Observation.—Recognizable? Refers merely to siphuncle of some Endoceras.

**Endoceras atlanticum** (Barrande).

Orthoceras atlanticum Barrande, Syst. Sil. du Boheme, ser. 4, 2, 1870, pl. 430, figs. 12, 13.

Ordovician: Newfoundland.

ENDOCERAS AULEMA Miller. See Nanno aulema.

**Endoceras bristolense** Miller.

Endoceras bristolense Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 85, pl. 4, figs. 2, 2a.

Richmond (Maquoketa): Bristol, Illinois.

**Endoceras(?) champlainense** Ruedemann.

Endoceras(?) champlainense Ruedemann, Bull. New York State Mus., 90, 1906, p. 418, pl. 1, figs. 1-4, text fig. 5.

Canadian (Beekmantown): Near Beekmantown, New York.

Observation.—Compare Endoceras consuetum Sardeson.

**Endoceras clarkel** (Wetherby).

Colpoceras clarkel Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 77, pl. 2, figs. 5, 5a.

Colpoceras clarkii Miller, N. A. Geol. Pal., 1889, p. 432, fig. 727.

Trenton (Curdsville): Mercer County, Kentucky.

**Endoceras consuetum** Sardeson.

Endoceras consuetum Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 103, pl. 6, fig. 11.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 42.

Canadian (Shakopee): Near Monroe and near Pickett Station, Wisconsin.

Observation.—Compare Endoceras champlainense Ruedemann.

ENDOCERAS CRASSISIPHONATUM Whiteaves. See Narthecoceras crassisiphonatum.

ENDOCERAS DISTANS Hall. See Actinoceras distans.

ENDOCERAS DUPLICATUM Hall. See Cameroceras duplicatum.



**Endoceras egani** Miller.

Endoceras egani Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 84, pl. 4, figs. 1, 1a, 1b.

Richmond (Maquoketa): Bristol, Illinois.

ENDOCERAS ELONGATUM Keyes. See Endoceras proteiforme elongatum.

**Endoceras gemelliparum** Hall.

Endoceras gemelliparum Hall, Pal. New York, 1, 1847, p. 60, pl. 19, figs. 1a, b.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 267; Bull. Soc. Geol. France, (2), 12, 1855, p. 166.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152.

Black River: Hendersons Bay, Jefferson County, New York.

ENDOCERAS HENNEPINI Miller. See Cameroceras hennepini.

**Endoceras(?) hudsoni** Ruedemann.

Endoceras(?) hudsoni Ruedemann, Bull. New York State Mus., 90, 1906, p. 421, pl. 7, fig. 1, fig. 6.

Chazyan (Valcour): Valcour Island, New York.

**Endoceras hudsonicum** Parks.

Endoceras hudsonicum Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 37. Niagara (Guelph); Severn River, Ontario.

ENDOCERAS INÆQUABILE Miller. See Cameroceras inæquabile.

**Endoceras insulare** (Barrande).

Orthoceras insulare Barrande, Syst. Sil. du Boheme, 4th ser., 2, 1870, pl. 430, figs. 1-11; pl. 31, figs. 1-10.

Ordovician: Newfoundland.

ENDOCERAS LATIVENTRUM Hall. See Cameroceras lativentrum.

ENDOCERAS LONGISSIMUM Hall. See Vaginoceras longissimum.

**Endoceras magister** Ruedemann.

Endoceras magister Ruedemann, Bull. New York State Mus., 90, 1906, p. 423, pl. 8, fig. 1, fig. 7.

Chazyan (Valcour): Valcour, New York.

**Endoceras magniventrum** Hall.

Endoceras magniventrum Hall, Pal. New York, 1, 1847, p. 218, pl. 53, figs. 1a-e; pl. 54, fig. 2b.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 267; Bull. Soc. Geol. France, 2d ser., 1855, p. 166.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 243.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 154.

Trenton: Middleville, New York.

ENDOCERAS MARCOUI Barrande. See Cameroceras marcoui.

**Endoceras montrealense** (Billings).

Orthoceras montrealensis Billings, Can. Nat. Geol., 4, 1859, pp. 361-363, figs. 11c-e; Geol. Canada, Geol. Surv. Canada, 1863, p. 121, figs. 37a-c.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 552, figs.—Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 34.

Endoceras montrealense Hall, Pal. New York, 5, pt. 2, 1879, p. 221 (gen. ref.).—Ruedemann, Bull. New York State Mus., 90, 1906, p. 424, pl. 9, fig. 8, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 42, fig. 1238.

Orthoceras sordidum Whitfield, Bull. Amer. Mus. Nat. Hist., 3, p. 34, pl. 2, fig. 4. Canadian (Beekmantown): Near St. Eustache, Quebec; Fort Cassin, Vermont.

**ENDOCERAS MULTITUBULATUM** (Hall). See *Vaginoceras multitubulatum*.

**Endoceras? ommaneyi** Salter.

*Orthoceras Ommaneyi* Salter, App. to Sutherland's Jour. Voyage in Baffin Bay, etc., 1852, p. 222, pl. 5, figs. 16, 17; in Sutherland, Quart. Jour. Geol. Soc., 9, p. 314.—Houghton, Jour. Roy. Dublin Soc., 1, 1858, p. 249; in McClintock's "Discovery of the Fate of Franklin and his Companions" App. 4, 1859, p. 381.

*Endoceras? ommaneyi* Foord, Cat. Foss. Ceph. British Mus., pt. 1, 1888, p. 155. Niagaran: Assistance Bay, Cornwallis Island, Arctic America.

**Endoceras proteiforme** Hall.

*Endoceras proteiforme* Hall, Pal. New York, 1, 1847, p. 208, pls. 46, figs. 1a-b, 2; 48, figs. 1, 4; 49, figs. 1a-e; 50, figs. 1-3; 52, 1a-b; 53, figs. 1a-c; 55, fig. 1, p. 311, 85, figs. 1a-f.—Gebhard, 9th Rep. New York State Cab. Nat. Hist. 1856, p. 45.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151, pl. 16, figs. 1-3a, pl. 12, figs. 1-5; Man. Geol. 1860, p. 96, fig. 85.—Hitchcock, Geol. Vermont, 1, 1862, p. 299; *ibid.*, 2, pl. 12, fig. 1.—Chapman, Canadian Jour., n. s., 8, 1863, p. 21, fig. 131, p. 200, fig. 194; Expos. Min. Geol. Canada, 1864, p. 129, fig. 131, p. 172, fig. 194.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1876, p. 37, fig. 12c.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 130.—Emerson, Narrative Hall's Sec. Arctic Exped., U. S. Navy Dep., 1879, p. 579.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 86, pl. 12, figs. 1, 1a-c.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 153.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 243.—Hyatt, Zittel-Eastman, Texb. Pal., 1900, p. 515, fig. 1056.—Ruedemann Bull. New York State Mus., 90, 1906, p. 413, fig. 3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1029, pl. 50, figs. 1-1d.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 42, fig. 1239, 1240.

*Cameroceras proteiforme* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 777, pl. 48, figs. 1, 2; pl. 49, fig. 2; pl. 50, figs. 1, 2 (?); pl. 51, figs. 1-3; pl. 53, figs. 4-5.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 169.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 190, pl. 13, fig. 5.—Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580.

Trenton: Middleville, Lowville, Watertown, etc., New York. The species has been identified from almost all the Mohawkian and Cincinnati formations of the United States and Canada.

*Plesiotype*.—Cat. No. 17401, U.S.N.M. (Walcott, 1884).

Observation.—The above references undoubtedly include a variety of forms.

**Endoceras proteiforme elongatum** Hall.

*Endoceras proteiforme? var. elongatum* Hall, Pal. New York, 1, 1847, p. 216, pl. 52, figs. 1a, b.

*Endoceras elongatum* Keyes, Missouri Geol. Surv., 5, 1894, p. 220.

*Cameroceras proteiforme var. elongatum*, Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580 (gen. ref.)

Trenton: Middleville, New York.

**ENDOCERAS PROTEIFORME VAR. LINEOLATUM** Hall. See *Orthoceras lineolatum*.

**Endoceras proteiforme strangulatum** Hall.

*Endoceras proteiforme var. strangulatum* Hall, Pal. New York, 1, 1847, p. 212, pl. 46, figs. 4a-e.

Trenton: Middleville, New York.

**ENDOCERAS PROTEIFORME VAR. TENUISTRIATUM** Hall. See *Orthoceras tenuistriatum*.

**ENDOCERAS PROTEIFORME VAR. TENUITEXTUM** Hall. See *Orthoceras tenuitextum*.



**Endoceras rapax** Billings.

*Orthoceras rapax* Billings, Canadian Nat. Geol., 5, 1860, p. 176.

*Endoceras rapax* Miller, N. A. Geol. Pal., 1889, p. 437 (gen. ref.).

Black River: Kingston, Ontario.

**Endoceras rottermundi** (Barrande).

*Orthoceras* (*Endoceras*) *rottermundi* Barrande, Syst. Sil. du Boheme, 2d ser., 1866, pl. 220.

*Endoceras rottermundi* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 749, pl. 220, figs. 9-11.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 151.

Black River: Island in Lake Huron (?Thessalon Island).

*ENDOCERAS* (*NARTHECOCERAS*) *SIMPSONI* Whiteaves. See *Narthecoceras simpsoni*.

**Endoceras subannulatum** (Whitfield).

*Endoceras* (*Cameroceras*) *subannulatum* Whitfield, Ann. Rep. for 1879, Wisconsin, Geol. Surv., 1880, p. 56; Geol. Wisconsin, 4, 1882, p. 230, pl. 7, figs. 15, 16.

*Endoceras subannulatum* Chamberlin, Geol. Wisconsin, 1, 1883, p. 159, fig.—Whiteaves, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 78, pl. 5, figs. 2, 2a; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 202.

Black River: Beloit, Wisconsin; Valley of Red River, western shore of Lake Winnipeg, East Selkirk, etc., Canada.

**Endoceras subcentrale** Hall.

*Endoceras subcentrale* Hall, Pal. New York, 1, 1847, p. 59, pl. 17, fig. 4.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 244.

Black River (Watertown): Watertown, New York.

**Endoceras vanuxemi** (Conrad).

*Diploceras Vanuxemi* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1848, p. 267, pl. 16, fig. 2.

*Endoceras vanuxemi* Miller, N. A. Geol. Pal., 1899, p. 437 (gen. ref.).

Trenton: Trenton Falls, New York.

Observation.—Clarke (Geol. Minnesota, 3, 1897) says *Diploceras* is unquestionably a *Cameroceras* and the type *D. vanuxemi* probably the same as *Endoceras proteiforme*.

**Endoceras virgatum** (Hall).

*Colpoceras virgatum* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 182, pl. 5, fig. 2 (doc. ed., p. 174).

*Endoceras virgatum* Hall, Pal. New York, 5, pt. 2, 1879, p. 220 (gen. ref.).

Black River: Lewis County, New York.

**ENDODESMA** Ulrich.

Genotype: *E. cuneatum* Ulrich.

*Endodesma* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 525.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527.

**Endodesma compressum** Ulrich.

*Endodesma compressum* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 529, pl. 36, figs. 35, 37.

Trenton (Prosser): Near Wykoff, Minnesota.

*Holotype*.—Cat. No. 46194, U.S.N.M.

**Endodesma cuneatum** Ulrich.

*Endodesma cuneatum* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 526, pl. 36, figs. 33, 34.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527, fig. 715d, e. Trenton (Prosser): Near Wykoff, Minnesota.  
*Holotype*.—Cat. No. 46195, U.S.N.M.

**Endodesma gesneri** (Billings).

*Modiolopsis Gesneri* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 172, fig. 157a, b; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 43, figs. 45a, b (adv. sheets, 1862).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 408, figs.  
*Endodesma gesneri* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 528, pl. 37, figs. 3, 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527, fig. 715a. Black River and Trenton: Ottawa, etc., Ontario.  
*Plesiotype*.—Cat. No. 46196, U.S.N.M.

**Endodesma orthonotum** (Meek and Worthen).

*Modiolopsis orthonota* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 295, pl. 1, fig. 7a.  
*Modiolopsis rectiformis* Worthen, Bull. 1, Illinois State Mus. Nat. Hist., 1882, p. 38.  
*Endodesma orthonotum* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 527, pl. 37, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527, fig. 715b, c. Black River (Platteville): Dunleith, Illinois.  
*Plastotype*.—Cat. No. 46197, U.S.N.M.

**Endodesma postlatum** Ulrich.

*Endodesma postlatum* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 527, pl. 37, figs. 5, 6.  
 Trenton (Galena): Dubuque, Iowa.

**Endodesma traneeps** (Raymond).

*Cyrtodonta traneeps* Raymond, Amer. Jour. Sci., 20, 1905, p. 372.  
 Chazyan (Crown Point): Valcour Island, New York.

**Endodesma trentonense** (Hall).

*Modiolopsis? trentonensis* Hall, Pal. New York, 1, 1847, p. 161, pl. 34, fig. 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 412, fig.  
*Lyonsia trentonensis* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, fig. 4.  
*Endodesma trentonensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 504 (gen. ref.). Trenton: New York.

**Endodesma undosum** Ulrich.

*Endodesma undosum* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 529, pl. 36, fig. 38. Black River (Platteville): Near Beloit, Wisconsin.

**ENDYMINIA** Vogdes. See *Endymionia* Billings.

**ENDYMION** Billings. See *Endymionia* Billings.

**ENDYMIONIA** Billings.

Genotype: *Endymion meeki* Billings.

*Endymion* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 93, 94 (adv. sheets, 1862).

*Endymionia* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 281.—Zittel, Handb. Pal., 2, 1885, p. 594.—Miller, N. A. Geol. Pal., 1889, p. 547.—Beecher, Amer. Jour. Sci., 3d ser., 49, 1895, p. 307; *ibid.*, 4th ser., 3, 1897, p. 187.

*Endyminia* Vogdes, Cal. Acad. Sci., Occ. Pap., 4, 1893, p. 253.



**Endymionia meeki** (Billings).

*Endymion meeki* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 94, fig. 84 (adv. sheets, 1862).

*Endymionia meeki* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 281.—Miller, N. A. Geol. Pal., 1889, p. 547, fig. 1006.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Table Head, Pistolet Bay, etc., Newfoundland (Quebec-N, P).

**ENOPLEURA** Wetherby. See *Ateleocystites* Billings.

**ENOPLEURA BALANOIDES** Wetherby. See *Ateleocystites balanoides*.

**ENOPLEURA CRUSTACEA** Bather. See *Ateleocystites balanoides*.

**ENTEROLASMA** Simpson.

Genotype: *Streptelasma strictum* Hall.

*Enterolasma* Simpson, Bull. New York State Mus., 39, 1900, p. 203.—Grabau, Bull. New York State Mus., 45, 1901, p. 136; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 136.

**Enterolasma caliculum** (Hall).

*Streptelasma calicula* Hall, Pal. New York, 2, 1852, p. 111, pl. 32, fig. 1a-k.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 113, pl. 7, figs. 4a-c.

*Petraia calicula* Billings, Geol. Surv. Canada, Geol. Canada, 1863, p. 308, fig. 310.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 627, fig.

*Cyathophyllum?* *caliculum* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 601, pl. 34, fig. 8.

*Enterolasma caliculus* Grabau, Bull. New York State Mus., 45, 1901, p. 137, fig. 29; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 137, fig. 29.

*Streptelasma* (*Enterolasma*) *caliculum* Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 56, fig. 76g, 77.

*Enterolasma* cf. *caliculus* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 24, pl. 1, fig. 1.

Silurian (Cataract-Guelph): Rochester, Lockport, etc., New York; Grimsby, etc., Ontario; Lake Temiscaming, Quebec; Wisconsin, Ohio, Tennessee, Alabama, etc.

**Enterolasma geometricum** (Foerste).

*Streptelasma calicula* var. *geometricus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 345, pl. 9, figs. 7, 12, 13.

*Streptelasma?* *geometricum* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 601, pl. 34, figs. 7, 12, 13.

Upper Medinan (Brassfield): Near Dayton and Todds Fork; near Wilmington, Ohio.

**Enterolasma waynense** (Safford).

*Petraia Waynensis* Safford, Geol. Tennessee, 1869, pp. 314, 320, pl. 5 (H), figs. 2a-h.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 628, figs.

*Streptelasma waynense* Miller, N. A. Geol. Pal., 1889, p. 205 (gen. ref.).

*Enterolasma waynense* Simpson, Bull. New York State Mus., 39, 1900, p. 204, figs. 13-15.

*Enterolasma* (*Petraia*) *waynense* Foerste, Jour. Geol., 11, 1903, p. 713 (loc. occ.).

Niagaran (Brownsport): Wayne, Decatur, and Perry Counties, Tennessee.

**ENTOMIS** Jones.

Genotype: *E. tuberosa* Jones.

*Entomis* Jones, Mem. Geol. Surv. Great Britain, Expl. Map 32, Scotland, 1861, p. 137.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 707.—Ulrich, Zittel-

**ENTOMIS**—Continued.

Eastman Textb. Pal., 1, 1900, p. 646.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1040.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 362.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 741.

**Entomis madisonensis** Ulrich.

*Entomis madisonensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 107, pl. 7, figs. 12a-b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1046, pl. 53, figs. 8, 8b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 362, fig. 1667, r, s.

Richmond (Whitewater-Saluda): Near Madison, Indiana.

*Holotype*.—Cat. No. 41565, U.S.N.M.

**Entomis waldronensis** Ulrich.

*Entomis waldronensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 2, 1891, p. 183, pl. 12, figs. 3a, 3b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 363, fig. 1668m, n.

Niagaran (Waldron): Waldron, Indiana.

*Holotype*.—Cat. No. 41566, U.S.N.M.

**ENTOMOLITUS PARADOXUS PISIFORMIS** Linnæus. See *Agnostus pisiformis*.

**ENTOMOSTRACITES PISIFORMIS** Wahlenberg. See *Agnostus pisiformis*.

**ENTOMOSTRACITES SCARABÆOIDES** Wahlenberg. See *Peltura scarabæoides*.

**ENTOMOSTRACITES SPINULOSUS** Wahlenberg. See *Parabolina spinulosa*.

**EOHARPES** Raymond.

Genotype: *Harpes primus* Barrande.

*Harpina* Novak (not Burmeister, 1844) Sitz. d. k. böhm. Gesell. d. Wiss. Math.-Naturw. Cl. for 1884, 1885, p. 215.—Clarke, Geol. Minnesota, pt. 2, 1894, p. 756.—Beecher, Amer. Jour. Sci., 49, 1895, p. 307; *ibid.*, 3, 1897, p. 185.

*Eoharpes* Raymond, Amer. Jour. Sci., 19, 1905, p. 378; Zittel-Eastman Textb. Pal., 1913, p. 711.

**Eoharpes antiquatus** (Billings).

*Harpes antiquatus* Billings, Canadian Nat. Geol., 4, 1859, p. 469, fig. 38; Geol. Canada, Geol. Surv. Canada, 1863, p. 133, fig. 67.

*Harpina antiquatus* Raymond, Annals Carnegie Mus., 3, 1905, p. 330, pl. 10, fig. 1.

*Eoharpes antiquatus* Raymond, 7th Rep. Vermont State Geol., 1910, p. 214, pl. 32, fig. 1; Ann. Carnegie Mus., 7, No. 1, 1910, p. 60.

Chazyan: Mingan Islands, Canada (Mingan); Valcour, Valcour Island and Chazy, New York; Isle La Motte, Vermont (Day Point, Crown Point).

**Eoharpes cassinensis** (Whitfield).

*Harpes cassinensis* Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 182, pl. 5, figs. 3, 4.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 55, figs. 3, 4.

Canadian (Beekmantown): Fort Cassin, Vermont.

**Eoharpes consuetus** (Billings).

*Harpes consuetus* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 64.

Anticostian (Chicotte): Southwest Point, Anticosti.

**Eoharpes dentoni** (Billings).

*Harpes Dentoni* Billings, Canadian Nat. Geol., 8, 1863, p. 36, fig.; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 183, fig. 166.

*Eoharpes dentoni* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 33, pl. 3, fig. 5.

Trenton (Curdsville): Ottawa, Ontario.



**Eoharpes escanablæ** (Hall).

Harpes escanablæ Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 211, pl. 27, fig. 2a.

Trenton: Escanaba River below Indian Creek, Michigan.

**Eoharpes granti** (Billings).

Harpes granti Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 326, fig. 314.

Canadian (Beekmantown): Stanbridge, Quebec.

**Eoharpes minnesotensis** (Clarke).

Harpina minnesotensis Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 755, fig. 76.

Trenton (Prosser): Hader, Minnesota.

*Holotype*.—Cat. No. 41889, U.S.N.M.

**Eoharpes ottawaensis** (Billings).

Harpes ottawaensis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 182, fig. 165; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 28.—Miller, N. A. Geol. Pal., 1889, p. 549, fig. 1011.

Harpina ottawaensis Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 757, fig. 79.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 191, pl. 14, figs. 1, 2.—Raymond, Annals Carnegie Mus., 3, 1905, p. 331, pl. 10, fig. 2.

Harpes (Harpina) ottawaensis Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 258, fig. 1546.

Eoharpes ottawaensis Bassler, Bull. Virginia Geol. Surv., 29, 1909, p. 111, fig. 10.—Raymond, 7th Rep. Vermont State Geol., p. 215, pl. 32, fig. 2.—Ruedemann, Bull. New York State Mus., 162, p. 116, pl. 9, fig. 1.

Chazy: Valcour, etc., New York (Day Point); Virginia (Liberty Hall.)

Trenton: Ottawa, Ontario; New Jersey, New York, Minnesota, etc.

*Plastotype*.—Cat. No. 41887, U.S.N.M.

**Eoharpes pustulosus** (Hall).

Ceraurus? pustulosus Hall, Pal. New York, 1, 1847, p. 246, pl. 61, figs. 2a, b.

Harpes pustulosus Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67 (gen. ref.).

Eoharpes pustulosus Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 542.

Black River: Watertown, New York.

**Eoharpes rutrellum** (Clarke).

Harpina rutrellum Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 757, figs. 80, 81.

Trenton (Prosser): Cannon Falls, and Minneapolis, Minnesota.

*Holotype*.—Cat. No. 41888, U.S.N.M.

**EOORTHIS** Walcott.

Genotype: *Orthis remnicha* Winchell.

*Orthis* (*Plectorthis*) Walcott (not Hall and Clarke), Proc. U. S. Nat. Mus., 28, 1905, pp. 257–259.

*Plectorthis* Grabau and Shimer (part) (not Hall and Clarke), N. A. Index Fossils, 1907, 1, p. 250.

*Eoorthis* Walcott, Smiths. Misc. Coll., 53, 1908, pp. 102–104; *ibid.*, 53, No. 4, 1908, pl. 11, and pp. 142 and 148; Mon. U. S. Geol. Surv., 51, 1912, p. 772.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 381.

*Orthis* (*Orusia*) Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 273.

*Orusia* Walcott, Smiths. Misc. Coll., 53, 1908, pl. 11, pp. 142, 148; U. S. Geol. Surv., Mon., 51, 1912, p. 765 (Genotype: *Anomites lenticularis* Wahlenberg).

**Eoorthis atava** (Matthew).

*Strophomena atava* Matthew, Trans. Roy. Soc. Canada, 1st ser., 1893, 10, sec. 4, pp. 102-103, pl. 7, fig. 8a-f.—Moberg and Segerberg, Medd. fran. Lunds Geol. Faltklubb, ser. B., No. 2, 1906.

*Rafinesquina?* *atava* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 338.

*Orthis* (*Plectorthis*) *atava* Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 259-260.

*Eoorthis atava* Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 774, pl. 95, figs. 7, 7a-b.

Canadian (Bretonian—Div. C 3a): Navy Island, St. John Harbor, New Brunswick.

**Eoorthis desmopleura** (Meek).

*Orthis coloradoensis* Meek (not Shumard), Proc. American Phil. Soc., 2, 1870, p. 425.

*Orthis desmopleura* Meek, Hayden's U. S. Geol. Surv. Wyoming, 1872, p. 295.

*Orthis* (*Plectorthis*) *desmopleura* Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 261.

*Eoorthis desmopleura* Walcott, Mon. U. S. Geol. Surv., 1912, 51, p. 777, pl. 96, figs. 1, 1a-r.

Upper Cambrian: Utah, New Mexico, Pennsylvania, etc.

Lower Ordovician: Glen Eyre, Queens Canyon, near Manitou, and Colorado Springs, Colorado.

*Holotype* and *plesiotypes*.—Cat. Nos. 7859, 52317, 52320, U.S.N.M.

**Eoorthis desmopleura nympha** Walcott.

*Orthis* (*Plectorthis*) *desmopleura nympha* Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 262.

*Eoorthis desmopleura nympha* Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 778, pl. 96, fig. 2,

Lower Ordovician: Williams Canyon, Manitou, Colorado; also Upper Cambrian of Wyoming.

*Holotype*.—Cat. No. 52333, U.S.N.M.

**Eoorthis johannensis** (Matthew).

*Orthisina*(?) *johannensis* Matthew, Trans. Roy. Soc. Canada, 1st ser., 9, sec. 4, 1892, pp. 49-50, pl. 12, figs. 13a-c.

*Clitambonites?* *johannensis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184.

*Orthis* (*Plectorthis*) *johannensis* Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 265, 266.

*Eoorthis johannensis* Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 781, pl. 97, figs. 10, 10a.

Canadian (Bretonian—Div. C 3a): Germaine Street, St. John, New Brunswick.

**Eoorthis (Orusia) lenticularis** (Wahlenberg).

*Anomites lenticularis* Wahlenberg, Nova Acta Regiae Soc. Sci. Upsal., 8, Petrif. tell. Svecanae, 1821, pp. 66, 67.

*Orthis lenticularis* Davidson, British Foss. Brachiopoda, 3, pt. 7, 1869, pp. 230-232, pl. 33, figs. 22-28 —Roemer, Leth. geog., pt. 1, Leth. Pal., Atlas, 1876, pl. 2, figs. 4a-c.—Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, pp. 46-48, pl. 12, figs. 9a-d; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, pp. 213-116, pl. 17, figs. 1a-d.

*Orthis* (*Orusia*) *lenticularis* Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 273-276.

*Orusia lenticularis* Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 98, figs. 1, 1a-p; 2, 2a-k; 3, 3a-b; 6, 6a-c. (See for complete bibliography.)

*Orthis lenticularis strophomenoides* Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 49, pl. 12, figs. 12-b; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 217, pl. 17, figs. 4a-b.



**Eoorthis (Orusia) lenticularis**—Continued.

Olenus limestone and shale of Norway and Sweden; Lingula flags of North Wales, etc.

Canadian (Bretonian—Div. C 3a-c): St. John, New Brunswick and Cape Breton, Nova Scotia.

**Eoorthis (Orusia) lenticularis atrypoides** (Matthew).

Orthis lenticularis var. atrypoides Matthew, Trans. Royal Soc. Canada, 9, 1892, p. 48, pl. 12, figs. 11a, 11b; Geol. Surv. Canada, Rept. Cambrian Rocks Cape Breton, 1903, p. 217, pl. 17, figs. 3a-b.

Orthis (Orusia) lenticularis atrypoides Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 276.

Orusia lenticularis atrypoides Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 769, pl. 98, fig. 5.

Canadian (Bretonian—Div. C 3a): Germaine Street, St. John, New Brunswick.

**Eoorthis (Orusia) lenticularis lyncioides** (Matthew).

Orthis lenticularis var. lyncioides Matthew, Trans. Royal Soc. Canada, 9, 1892, p. 49, pl. 12, figs. 10a-10c; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 216, pl. 17, figs. 2a-c.

Orthis (Orusia) lenticularis lyncioides Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 277.

Orusia lenticularis lyncioides Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 769, pl. 98, fig. 4.

Canadian (Bretonian—Div. C 3a): Germaine Street, St. John, New Brunswick.

**Eoorthis newtonensis** (Weller).

Orthis newtonensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, pp. 113, 114, pl. 1, figs. 3-5.

Orthis (Plectorthis) newtonensis Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 267.

Eoorthis newtonensis Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 784, pl. 97, figs. 9, 9a.

Upper Cambrian or Ozarkian (Kittatinny): Newton, Sussex County, New Jersey.

**Eoorthis wichitaensis** Walcott.

Orthis (Plectorthis) wichitaensis Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 271-272.

Eoorthis wichitaensis Walcott, Mon. U. S. Geol. Surv. 51, 1912, p. 790, pl. 94, figs. 1a-o, u.

Lower Ordovician: Near Manitou, El Paso County, Colorado. Also Upper and Middle Cambrian of Oklahoma, Missouri, etc.

*Holotype* and *paratypes*.—Cat. Nos. 52381, 52384, U.S.N.M.

**EOPHYTON (SCOLITHUS) DISPAR** James. See *Scolithus dispar*.**EOPOLYCHÆTUS** Ruedemann.

Genotype: *E. albaniensis* Ruedemann.

*Eopolychætus* Ruedemann, Bull. New York State Mus., 42, 1901, p. 573.

**Eopolychætus albaniensis** Ruedemann.

*Eopolychætus albaniensis* Ruedemann, Bull. New York State Mus., 42, 1901, p. 573, pl. 1, fig. 13.

Trenton (Snake Hill): Rural Cemetery, near Albany, New York.

**EOPTERIA** Billings.

Genotype: *E. typica* Billings.

*Eopteria* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 221.—Zittel, Handb.

Pal., 2, 1881, p. 36.—Miller, N. A. Geol. Pal., 1889, p. 480.

**Eopteria? ornata** Billings.

*Eopteria ornata* Billings, Pal. Foss. 1, Geol. Surv. Canada, 1865, p. 307, fig. 299, Ozarkian? (Levis-erratic): Point Levis, Quebec.

**Eopteria richardsoni** Billings.

*Eopteria richardsoni* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 306, text fig. 298.—Miller, N. A. Geol. Pal., 1889, p. 480, fig. 821.

Canadian (Beekmantown): Near St. Antoine, above Quebec, Canada.

**Eopteria typica** Billings.

*Eopteria typica* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 221.

Canadian (Quebec—G.): Port aux Choix, Newfoundland.

**EOSPONGIA** Billings.

Genotype: *E. roemeri* Billings.

*Eospongia* Billings, Geol. Vermont, 2, 1861, p. 955; Rep. Econ. Geol., etc., Vermont, 1862, p. 227.; Pal. Fossils, 1, Geol. Surv. Canada, 1865, pp. 18, 19 (adv. sheets, 1861).—Miller, N. A. Geol. Pal., 1889, p. 159.—Seely, Rep. State Geol. Vermont, 3, 1902, p. 153.

**Eospongia roemeri** Billings.

*Eospongia roemeri* Billings, Geol. Vermont, 2, 1862, p. 956; Rep. Econ. Geol., etc., Vermont, 1862, p. 228. Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 19 (adv. sheets, 1861).

Chazy (Mingan): Mingan Islands, Canada.

**EOSPONGIA VARIANS** Billings. See *Zittellella varians*.**EOTOMARIA** Ulrich and Scofield.

Genotype: *E. canalifera* Ulrich.

*Pleurotomaria* and *Raphistoma* (part) of American authors.

*Eotomaria*, Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 954, 1000.—Koken, Neues Jahrb. Min., Geol. and Pal., 1, 1898, p. 19.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642.

**Eotomaria areyi** Clarke and Ruedemann.

*Eotomaria areyi* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 68, pl. 8, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643.—Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 187, pl. 23, fig. 5.

Niagaran (Guelph): Rochester, New York.

Upper Monroan (Lucas and Amherstburg): Detroit River region, Michigan.

**Eotomaria canalifera** Ulrich.

*Eotomaria canalifera* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1002, pl. 69, figs. 9–14. (*E. sublaevis*, p. 954, in error.)

*Pleurotomaria canalifera* Miller, N. A. Geol. Pal., 1897, p. 769 (gen. ref.).

Stones River (Murfreesboro): Near Murfreesboro, Tennessee.

*Cotypes*.—Cat. No. 46055, U.S.N.M.

**Eotomaria? cassina** (Whitfield).

*Lophospira cassina* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 312, pl. 25, figs. 1–4.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 59, figs. 1–4.

*Eotomaria? cassina* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 991 (gen. ref.)

*Murchisonia cassina* Miller, N. A. Geol. Pal., 1899, p. 411 (gen. ref.).

Canadian (Beekmantown): Fort Cassin, Vermont.

**Eotomaria dryope** (Billings).

*Pleurotomaria dryope* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 170, fig. 154a, b.



**Eotomaria dryope**—Continued.

*Eotomaria dryope* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1003, pl. 69, figs. 21–25.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642, fig. 875c-e.

Black River: Pauquettes Rapids, Ottawa River, Canada; Minneapolis and Cannon Falls, Minnesota (Platteville); Lincoln County, Missouri (Auburn); Maury County, Tennessee.

*Plesiotypes*.—Cat. Nos. 45804, 45805, U.S.N.M.

**Eotomaria durhamensis** (Whiteaves).

*Pleurotomaria Durhamensis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 24, pl. 4, fig. 2; *ibid.*, pt. 2, 1895, p. 77.

*Eotomaria durhamensis* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 68, pl. 10, fig. 17.

Niagaran (Guelph): Durham, Ontario; Rochester, New York.

**Eotomaria elevata** Ulrich.

*Eotomaria elevata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1005, pl. 70, figs. 68–69.

*Scalites elevatus* Miller, N. A. Geol. Pal., 2d App., 1897, p. 770 (gen. ref.).

Trenton (Catheys): Hartsville, Tennessee.

*Holotype*.—Cat. No. 45806, U.S.N.M.

**Eotomaria galtensis** (Billings).

*Pleurotomaria Galtensis* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 343, fig. 349; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 154, fig. 136 (adv. sheets, 1862).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 709, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 75, pl. 11, fig. 7.

*Eotomaria galtensis* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70, pl. 10, figs. 10–12.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643, fig. 877.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 189, pl. 25, fig. 1, 2.

Niagaran (Guelph): Galt, etc., Ontario; Oak Orchard Creek, New York; Wisconsin.

Upper Monroan (Lucas and Amherstburg): Detroit River region, Michigan.

**EOTOMARIA HALEI** Clarke and Ruedemann. See *Euomphalopterus halei*.

**Eotomaria kayseri** Clarke and Ruedemann.

*Eotomaria kayseri* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70, pl. 7, fig. 1; pl. 8, fig. 1.

Niagaran (Guelph): Rochester, New York.

**Eotomaria labiosa** Ulrich.

*Eotomaria labiosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1003, pl. 69, figs. 15–17.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Holotype*.—Cat. No. 46056, U.S.N.M.

**Eotomaria laphami** (Whitfield).

*Pleurotomaria Laphami* Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 84; Geol. Wisconsin, 4, 1882, p. 296, pl. 18, fig. 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 455, pl. 11, fig. 4.

*Pleurotomaria (Eotomaria) laphami* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70 (gen. ref.).

**Eotomaria laphami**—Continued.

*Eotomaria laphami* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70 (gen. ref.).

Niagaran: Ashford, Wisconsin (Racine); Delphi, Indiana.

**Eotomaria obsoleta** Raymond.

*Eotomaria obsoletum* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 376; Ann. Carnegie Mus., 4, 1908, p. 192, pl. 49, figs. 12–14.

Chazy (Day Point, Crown Point): Crown Point and Valcour Island, New York.

**Eotomaria supracingulata** (Billings).

*Pleurotomaria supracingulata* Billings, Rep. Progr., Geol. Surv. Canada, 1857, p. 302; Geol. Canada, Geol. Surv. Canada, 1863, p. 181, fig. 175.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 717, fig.

*Eotomaria supracingulata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1894, p. 1004, pl. 69, figs. 26–29.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643, fig. 876.

*Raphistoma* (*Pleurotomaria*) *nasoni* Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 39, fig. 2.

*Raphistoma Nasoni* Whitfield, Geol. Wisconsin, 4, 1882, p. 215, pl. 6, figs. 2, 3.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 78, pl. 11, figs. 21, 21a.

*Pleurotomaria nasoni* Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 34.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 61, pl. 8, figs. 4–7.

Black River: St. Joseph's Island, Lake Huron; Dixon, etc., Illinois; Minneapolis, etc., Minnesota; Janesville and Beloit, Wisconsin; Eureka District, Nevada (Pogonip).

*Plesiotypes*.—Cat. Nos. 45807, 45808, U.S.N.M.

**Eotomaria vicina** Ulrich and Scofield.

*Eotomaria vicina* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1003, pl. 69, figs. 18–20.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643, fig. 875f.

Black River (Platteville): Minneapolis, Minnesota; Mineral Point, Wisconsin.

*Cotype*.—Cat. No. 45809, U.S.N.M.

**EOTROPHONIA** Ulrich.

Genotype: *E. setigera* Ulrich.

*Eotrophonia* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 91.

**Eotrophonia setigera** Ulrich.

*Eotrophonia setigera* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 91, pl. 4, fig. 5.

Eden (Economy): Covington, Kentucky.

*Cotypes*.—Cat. No. 46535, U.S.N.M.

**EREMOCERAS** Hyatt.

Genotype: *Cyrtoceras syphax* Billings.

*Eremoceras* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 282; Zittel-Eastman Textb. Pal., 1900, p. 530; *ibid.*, 2d ed., 1913, p. 611.

**Eremoceras syphax** (Billings).

*Cyrtoceras Syphax* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 194, text fig. 178.

*Eremoceras syphax* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 282 (gen. ref.).

Canadian (Levis-limestone): Point Levis, Quebec.

**ERIDONYCHIA** Ulrich.

Genotype: *E. apicalis* Ulrich.

*Eridonychia* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 639.—Cumings, 32d Ann. Rep.

Dep. Geol. Nat. Res. Indiana, 1908, p. 980.



**Eridonychia apicalis** Ulrich.

*Eridonychia apicalis* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 639, pl. 47, fig. 1.  
Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 46198, U.S.N.M.

**Eridonychia crenata** Ulrich.

*Eridonychia crenata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 640, pl. 47, fig. 3.  
Richmond (Waynesville): Waynesville, Ohio.

*Holotype*.—Cat. No. 46199, U.S.N.M.

**Eridonychia paucicostata** Ulrich.

*Eridonychia paucicostata* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 640, pl. 47, fig. 2.  
Maysville (Fairmount): Covington, Kentucky.

*Holotype*.—Cat. No. 46200, U.S.N.M.

**ERIDOPHYLLUM** Edwards and Haime.

Genotype: *E. verneuilanum* Edwards and Haime.

*Eridophyllum* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 171–423.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 459.—Billings, Canadian Jour., n. s., 4, 1859, p. 130.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 414.—Dybowski, Archiv. Naturf. Liv., Ehst- und Kurl., 5, 1873, p. 337.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 34.—Zittel, Handb. Pal., 1, 1879, p. 233.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 356.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 728.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, pp. 25, 26.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 71.

**Eridophyllum dividium** Davis.

*Eridophyllum dividium* Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, 1885, pl. 109, figs. 3–12.

Niagaran (Louisville): Louisville, Kentucky.

*Cotype*.—Cat. No. 52776, U.S.N.M.

**Eridophyllum eruciforme** Davis.

*Eridophyllum eruciforme* Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 107.

Niagaran (Louisville): Louisville, Kentucky.

**ERIDOPHYLLUM HURONICUM** Davis. See *Diphyphyllum huronicum*.**Eridophyllum louisvillense** Greene.

*Eridophyllum louisvillense* Greene, Cont. Indiana Pal., 1, pt. 11, 1903, p. 98, pl. 31, fig. 1.

Niagaran (Louisville): Louisville, Kentucky.

**Eridophyllum proliferum** Foerste.

*Eridophyllum proliferum* Foerste, Jour. Geol., 11, 1903, p. 713.

Niagaran (Brownsport): Near Brownsport Furnace, near Linden, and near Savannah, Tennessee.

**Eridophyllum rugosum** Edwards and Haime.

*Eridophyllum?* *rugosum* Edwards and Haime, Pol. Foss. des Terr. Pal., 1851, p. 424, pl. 10, figs. 4–4b.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 357.—Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 255, pl. 3, fig. 6.—Davis, Kentucky, Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 109, fig. 1; pl. 110.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 223, figs.—Simpson, Bull. New York State Mus., 8, 1900, p. 123, fig. 38.—Grabau and Shimer, N. A. Index Fossils 1, 1906, p. 72, fig. 111; 113 a.

**Eridophyllum rugosum**—Continued.

*Diphyphyllum rugosum* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 122, pl. 45, fig. 2.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 157.

Middle Silurian: Gotland; Louisville, Kentucky; Cabots Head, Georgian Bay, etc., Ontario (Niagaran).

**Eridophyllum sentum** Davis.

*Eridophyllum sentum* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 51, fig. 4; pl. 108, fig. 1.

Niagaran (Louisville): Louisville, Kentucky.

**ERIDOPHYLLUM VENNORI** Billings. See *Synaptophyllum multicaule*.

**ERIDORTHIS** Foerste. See *Hebertella* subgenus *Eridorthis*.

**ERIDOTRYPA** Ulrich.

Genotype: *E. mutabilis* Ulrich.

*Batostomella* (in part) Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 375, 432.

*Eridotrypa* Ulrich, Geol. Minnesota, 3, 1893, p. 264.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 756.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, p. 32.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 29.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 745.—Hennig, Archiv. für Zool., 4, 21, p. 36.—Grabau and Shimer, N. A. Index Fossils, 1, 1908, p. 134.—Bassler, Bull. U. S. Nat. Mus., 77, p. 242.

**Eridotrypa ædilis** (Eichwald).

*Cladopora ædilis* Eichwald, Bull. Soc. Nat. Moscou, No. 4, 1855, p. 457; Leth. Rossica, 1, 1860, p. 404, pl. 24, figs. 12, 13.

*Monticulipora ædilis* Dybowski, Die Chætetiden Ostbaltischen Silur-Formation, 1877, p. 98, pl. 3, figs. 5, 5a.

*Eridotrypa ædilis* Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 242, 244, pl. 4, figs. 5, 5a; figs. 137, 138.

*Eridotrypa mutabilis* Ulrich, Geol. Minnesota, 3, 1893, p. 265, pl. 26, figs. 20–32.—Sardeson, Jour. Geol., 9, 1901, p. 13, pl. A, fig. 11.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 134, fig. 188f, 190f.

Middle Ordovician: Various localities in Esthonia, Russia; Goodhue, Ramsey, and Dakota Counties, Minnesota; Wisconsin, Tennessee, Kentucky, Ontario, etc. (Black River and Trenton).

*Plesiotypes*.—Cat. No. 43536, U.S.N.M. *Cotypes* of *E. mutabilis*.

**Eridotrypa ædilis minor** (Ulrich).

*Eridotrypa mutabilis* var. *minor* Ulrich, Geol. Minnesota, 3, 1893, p. 266, pl. 26, figs. 20, 21, 29, 30.

*Eridotrypa ædilis minor* Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 245, fig. 139.

Middle Ordovician: Cannon Falls, etc., Minnesota (Trenton-Prosser); Wesenberg, Esthonia, Russia (Wesenberg).

*Cotypes*.—Cat. No. 43537, U.S.N.M.

**Eridotrypa briareus** (Nicholson).

*Chætetes briareus* Nicholson, Pal. Ohio, 2, 1875, p. 202, pl. 21, 13–13b.

*Monticulipora* (*Monotrypa*) *briareus* Nicholson, Genus *Monticulipora*, 1881, p. 198, pl. 2, figs. 5–5c.

*Monticulipora briarea* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 172.—J. F. James, *ibid.*, 16, 1894, p. 191.

*Monticulipora* (*Chætetes*) *briareus* Chamberlin, Geol. Wisconsin, 1, 1883, p. 172, fig.



**Eridotrypa briareus**—Continued.

*Monotrypella briarea* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 248, 256 (gen. ref.).

*Eridotrypa briareus* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 237.—Nickles, Bull. Kentucky Geol. Surv. No. 5, 1905, p. 43, pl. 1, figs. 4, 5.

Trenton: Covington, Kentucky. An abundant species in central Kentucky (Cynthiana) and central Tennessee (Bigby, Cathey).

**Eridotrypa echinata** (Hall).

*Trematopora echinata* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 11, figs. 1-5; *ibid.*, Mus. ed., 1879, p. 112, pl. 11, figs. 1-5; 11th Ann. Rep., Indiana Geol. Nat. Hist., 1882, p. 233, pl. 10, figs. 1-5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 1200, figs.

*Eridotrypa echinata* Ulrich, Geol. Minnesota, 3, 1893, p. 265.

Niagaran (Waldron): Waldron, Indiana.

**Eridotrypa exigua** Ulrich.

*Eridotrypa exigua* Ulrich, Geol. Minnesota, 3, 1893, p. 266, pl. 26, figs. 17-19.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 245, 246, fig. 140.

Trenton: Cannon Falls, Minnesota (Prosser); Trenton Falls, New York; Chimney Point, Vermont.

Middle Ordovician (Jewe): Near Jewe, Esthonia, Russia.

*Cotypes*.—Cat. No. 43535, U.S.N.M.

*ERIDOTRYPA MUTABILIS* Ulrich. See *Eridotrypa ædilis*.

*ERIDOTRYPA MUTABILIS* var. *MINOR* Ulrich. See *Eridotrypa ædilis minor*.

**Eridotrypa nodulosa** Bassler.

*Eridotrypa nodulosa* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 30, pl. 11, figs. 14, 15; pl. 25, figs. 1-3.

Clinton (Rochester): Lockport and Rochester, New York.

*Cotypes*.—Cat. No. 35524, U.S.N.M.

**Eridotrypa parvulipora** Ulrich and Bassler.

*Eridotrypa parvulipora* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 272, pl. 43, figs. 5-8; pl. 44, figs. 7, 8.

Helderbergian (Keyser): Keyser and Cherry Run, West Virginia; Cumberland, Maryland.

*Cotypes*.—Cat. No. 53643, U.S.N.M.

**Eridotrypa similis** Bassler.

*Eridotrypa similis* Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 31, 32, pl. 12, figs. 10-14; pl. 26, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 134.

Clinton (Rochester): Lockport, etc., New York; Grimsby and Thorold, Ontario.

*Cotypes*.—Cat. No. 35519, U.S.N.M.

**Eridotrypa simulatrix** (Ulrich).

*Batostomella simulatrix* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 432, pl. 35, figs. 1-1g.

*Eridotrypa simulatrix* Ulrich, Geol. Minnesota, 3, 1893, p. 265.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 828, pl. 16, figs. 4, 4b; pl. 29, figs. 5, 5a.

*Monticulipora simulatrix* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 194.

Richmond: Clarksville, Waynesville, and other localities in Ohio; Weisberg and Versailles, Indiana; Savannah, Illinois; Anticosti.

*Cotypes*.—Cat. No. 43744, U.S.N.M.

**Eridotrypa solida** (Hall).

Trematopora solida Hall, Pal. New York, 2, 1852, p. 153, pl. 40a, figs. 6a-c.—  
Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 258.

Homotrypa? solida Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900,  
p. 293.

Eridotrypa solida Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 30, 31, pl. 12,  
figs. 7-9; pl. 24, figs. 20-23; pl. 25, fig. 16.

Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby and Thor-  
old, Ontario.

*Plesiotypes*.—Cat. No. 35525, U.S.N.M.

**Eridotrypa spinosa** Bassler.

Eridotrypa spinosa Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 29, 30, pl. 12,  
figs. 1-3; pl. 25, fig. 15.

Clinton: Grimsby, Ontario; Lockport, Lewiston, and Rochester, New York  
(Rochester); Osgood, Indiana (Osgood).

*Cotypes*.—Cat. Nos. 35521, 35739, U.S.N.M.

**Eridotrypa striata** (Hall).

Trematopora striata Hall, Pal. New York, 2, 1852, p. 153, pl. 40, fig. 7a-d.—  
Grabau, Bull. New York State Mus., 45, 1901, p. 167, fig. 66.

Eridotrypa striata Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 32, pl. 12,  
figs. 4-6; pl. 24, figs. 3-6; pl. 25, fig. 14.

Clinton: Lockport, Niagara Falls, and Rochester, New York; Grimsby, Ontario  
(Rochester); Osgood, Indiana (Osgood).

*Cotypes*.—Cat. No. 35545, U.S.N.M.

**Eridotrypa trentonensis** (Nicholson).

Monticulipora (Heterotrypa) Trentonensis Nicholson, Genus Monticulipora, 1881,  
p. 149, fig. 28.

Monotrypella Trentonensis Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 15.—  
Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 83.

Eridotrypa trentonensis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1890,  
p. 238.

Trenton: Peterboro, Ontario; Mercer County, Kentucky.

**ERIDOTRYPA VEVAYENSIS** Cumings. See *Batostoma jamesi*.

**ERIPTYCHIUS** Walcott.

Genotype: *E. americanus* Walcott.

Eriptychius Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 167.

**Eriptychius americanus** Walcott.

Eriptychius americanus Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 167, pl. 4,  
figs. 5-11.

Black River (Harding): Canyon City, Colorado.

**Erisocrinus? bipartitus** (Troost).

Donacirinites bipartitus Troost MS., 1850.

Erisocrinus? bipartitus (Troost) Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 98,  
pl. 6, figs. 8, 9.

?Niagaran (Brownsport): Decatur County, Tennessee.

Observation.—Probably a Graphiocrinus from the Carboniferous of the Missis-  
sippi Valley and not from Decatur County, Tennessee [Frank Springer.]

**ESCHARA BIFURCATA** Van Cleve. See *Pachydictya bifurcata*.

**ESCHARA BIPUNCTATA** Van Cleve. See *Phænopora expansa*.



*ESCHARA COMPRESSA* Van Cleve. See *Phænopora magna*.

*ESCHARA MULTIFIDA* Van Cleve. See *Phænopora multifida*.

*Eschara ovatopora* Troost. Not recognizable.

*Escharia ovatopora* Troost, 5th Geol. Rep. Tennessee, 1840, p. 75.

Ordovician: Near Nashville, Tennessee.

*ESCHARA RAMOSA* Van Cleve. See *Phænopora fimbriata*.

*Eschara reticulata* Troost. Not recognizable.

*Escharia reticulata* Troost, 5th Geol. Rep. Tennessee, 1840, p. 75.

Ordovician: Near Nashville, Tennessee.

*ESCHARINA DISTORTA* James. See *Rhinopora verrucosa*.

### **ESCHAROPORA** Hall.

Genotype: *E. recta* Hall.

*Escharopora* Hall, Pal. New York, 1, 1847, p. 72.—Eichwald, *Lethæa Rossica*, 1, 1860, p. 435.—Miller, N. A. Geol. Pal., 1889, p. 301.—Ulrich, Geol. Minnesota, 3, 1893, p. 167; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 279.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 45.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 745.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 115; Zittel-Eastman Textb. Pal., 1913, p. 345.

*Nicholsonia* Waagen and Wentzel, Pal. Indica, 13th ser., 1886, p. 874.

*Ptilodictya* (in part) of various authors.

### **Escharopora acuminata** (James).

*Ptilodictya acuminata* James, Catal. Foss. Cincinnati Group, p. 3.

*Escharopora acuminata* Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 36.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 829.

*Sagenella striata* James, Paleontologist, No. 3, 1899, p. 22.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 53.

Eden: Cincinnati, Ohio, and vicinity.

Observation.—*Sagenella striata* was founded upon the expanded base of this species.

### **Escharopora angularis** Ulrich.

*Escharopora angularis* Ulrich, Geol. Minnesota, 3, 1893, p. 168, pl. 12, figs. 1-4, 30, 31.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 344, fig. 504a.

Black River (Platteville and Decorah): Minneapolis, etc., Minnesota; High Bridge, Kentucky.

*Cotypes*.—Cat. No. 43538, U.S.N.M.

### **ESCHAROPORA (PTILODICTYA) ANGUSTA** Hall. See *Ptilodictya angusta*.

### **Escharopora briareus** (Ulrich).

*Ptilodictya briareus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 165, pl. 7, figs. 6-6b.

*Escharopora briareus* Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 239.

Stones River (Lebanon): Lebanon, Shelbyville, and Columbia, Tennessee.

*Holotype*.—Cat. No. 43728, U.S.N.M.

Observation.—The form called by Safford *Ptilodictya multiramis* (not defined) is probably referable to this species.

### **Escharopora confluens** Ulrich.

*Escharopora confluens* Ulrich, Geol. Minnesota, 3, 1893, p. 171, pl. 13, figs. 1-11.

Black River (Decorah): Minneapolis, etc., Minnesota.

*Cotypes*.—Cat. No. 43539, U.S.N.M.

**Escharopora falciformis** (Nicholson).

*Ptilodictya cruciformis* D'Orbigny, Prodr. de Pal., 1, 1849, p. 21 (not defined).—

Boule and Thevenin, Ann. de Pal., 1, fasc. 1, 1906, p. 4, pl. 1, figs. 7-9.

*Ptilodictya falciformis* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 15, 1875, p. 177, pl. 14, figs. 1-1b; Pal. Ohio, 2, 1875, p. 259, pl. 25, figs. 7, 7b; Pal. Province Ontario, 1875, p. 13, fig. 2.—Zittel, Handb. Pal., 1, 1880, p. 604, fig. 431.—Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 265, pl. 12, fig. 1.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 827, figs.

*Escharopora falciformis* Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 830, pl. 16, figs. 5, 5a.

*Escharopora recta* Quenstedt, Roehren- und Sternkorallen, 1881, p. 94, pl. 146, pp. 69, 70.

*Crateripora lineata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 30, pl. 7, figs. 28, 28a.

*Crateripora lineata* var. *expansa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 30.

Maysville: Cincinnati, Ohio, and vicinity (Mt. Hope, Fairmount); Nashville and Columbia, Tennessee (Leipers); Appalachians of Tennessee and Virginia.

*Plesiotypes*.—Cat. Nos. 43729, 43730, U.S.N.M. *Holotype* of *C. lineata* and var. *expansa*.

Observation.—*Crateripora lineata* and var. *expansa* were applied to the articulating basal sockets of this species before their true nature was known.

**Escharopora hilli** (James).

*Ptilodictya Hilli* James, Paleontologist, No. 1, 1878, p. 4.—Ulrich, Jour. Cincinnati Nat. Hist., 5, 1882, pl. 7, figs. 7, 7a.—Nettleroth, Kentucky Fossil Shells, 1885, p. 30, pl. 33, figs. 1, 2, 4, 5.—Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Nickles, Bull. Kentucky Geol. Surv., No. 5, 1905, p. 53, pl. 3, figs. 2, 3.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 37.

Maysville (Fairmount): Bank of the Ohio River at Cincinnati, Ohio (drift); Boyle and Lincoln Counties, Kentucky.

*Plesiotypes*.—Cat. Nos. 43724, 51377, U.S.N.M.

**Escharopora libana** (Safford).

*Ptilodictya? libana* Safford, Geol. Tennessee, 1869, p. 286.

*Escharopora libana* Ulrich, Geol. Minnesota, 3, 1893, p. 167.

Stones River (Lebanon): Lebanon, Tennessee.

*Cotypes*.—Cat. No. 43477, U.S.N.M.

**Escharopora? limitaris** Ulrich.

*Escharopora? limitaris* Ulrich, Geol. Minnesota, 3, 1893, p. 172, figs. 9a-b, pl. 13, figs. 12, 13.

Black River (Decorah): Minneapolis and Preston, Minnesota; Lake Nipissing, Ontario.

*Cotypes*.—Cat. No. 43807, U.S.N.M.

**Escharopora maculata** (Ulrich).

*Ptilodictya maculata* Ulrich Jour., Cincinnati Soc. Nat. Hist., 5, 1882, p. 163, pl. 6, 17, pl. 7, figs. 4, 4a; Geol. Surv. Illinois, 8, 1890, fig. 6b (p. 317).

*Escharopora maculata* Ulrich, Geol. Minnesota, 3, 1893, p. 167.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 43726, U.S.N.M.



**Escharopora pavonia** (D'Orbigny).

*Ptilodictya pavonia* D'Orbigny, *Prodr. de Pal.*, 1, 1849, p. 22.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 163, pl. 7, figs. 3, 3d.

*Chætetes pavonia* Milne-Edwards and Haime, *Pol. Foss. Terr. Pal.*, 1851, p. 267, pl. 19, figs. 4, 4a.—Rominger, *Proc. Acad. Nat. Sci. Philadelphia*, 1866, p. 116.—Quenstedt, *Röhren- und Sternkorallen*, 1881, p. 79, pl. 146, figs. 21–25.

*Monticulipora pavonia* Milne-Edwards, *Hist. Nat. des. Corall.*, 3, 1860, p. 276.—James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 11, 1888, p. 18.—James, *ibid.*, 18, 1895, p. 70.

*Monticulipora* (Monotrypa) *pavonia* Nicholson, *Genus Monticulipora*, 1881, p. 195, fig. 41, pl. 6, figs. 3, 3a.

*Monotrypa pavonia* Nicholson in Steinmann, *Neues Jahrb. Min., Geol. Pal.*, 1, 1882, pl. 4, fig. 7.

*Nicholsonia pavonia* Waagen and Wenzel, *Pal. Indica*, 13th ser., 1886, p. 874.

*Heterodictya pavonia* Ulrich, *Catal. Foss. Cincinnati Group*, 1880, p. 10.

*Escharopora pavonia* Ulrich, *Geol. Minnesota*, 3, 1893, p. 167.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 240.—Bassler, *Proc. U. S. Nat. Mus.*, 26, 1903, p. 571, pl. 20, figs. 3, 4; *ibid.*, 30, 1906, p. 37.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 832, pl. 16, fig. 6; pl. 29, fig. 6.

*Cyclopora Jamesi* Prout, *Trans. St. Louis, Acad. Sci.*, 1, 1859, p. 578.

*Stictopora clathratula* James, *Catal. Foss. Cincinnati Group* (not defined).

*Chætetes? clathratulus* Nicholson, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 509, pl. 30, figs. 1, 1b; *Pal. Ohio*, 2, 1875, p. 209, pl. 22, figs. 2, 2b; *Ann. Mag. Nat. Hist.*, 4th ser., 18, 1876, p. 91, pl. 5, figs. 9, 9a.

Maysville: Cincinnati, Ohio, and vicinity (Fairmount); Central Tennessee (Leipers).

*Plesiotype*.—Cat. No. 43725, U.S.N.M. (Ulrich).

Observation.—Boule and Thevenin have refigured D'Orbigny's so-called types of this species, but unfortunately chose a specimen of *Peronopora decipiens* for this purpose. D'Orbigny's original description and Edwards and Haime's figures leave no doubt that the author of this species had this abundant *Escharopora* in mind.

**Escharopora ponderosa** (Ulrich).

*Ptilodictya ponderosa* Ulrich, *Amer. Geol.*, 1, 1888, p. 308.

Trenton (Upper): Covington, Kentucky.

**Escharopora ramosa** (Ulrich).

*Ptilodictya ramosa* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1888, p. 164, pl. 7, figs. 5, 5a.

*Escharopora ramosa* Ulrich, *Geol. Minnesota*, 3, 1893, p. 167.

Stones River (Lebanon): Lebanon, Tennessee.

*Holotype*.—Cat. No. 43727, U.S.N.M.

**Escharopora recta** Hall.

*Escharopora recta* Hall, *Pal. New York*, 1, 1847, p. 73, pl. 26, figs. 1a–g.—Hitchcock, *Geol. Vermont*, 1, 1861, p. 290, fig. 188.

*Ptilodictya recta* Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 205, pl. 7, figs. 1a–d.—Billings, *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 158, fig. 120a.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 153, fig.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, p. 828, figs.

Trenton: Middleville and Jacksonburg, New York; Canada and Minnesota.

**ESCHAROPORA RECTA** Quenstedt. See *Escharopora falciformis*.

**Escharopora recta nodosa** Hall.

*Escharopora recta* var. *nodosa* Hall, Pal. New York, 1, 1847, p. 73, pl. 26, fig. 2.  
Trenton: Middleville and Jacksonburg, New York.

**ESCHAROPORA SILURIANA** Weller. See *Diplostenopora siluriana*.

**Escharopora subrecta** (Ulrich).

*Ptilodictya subrecta* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 63.

*Escharopora subrecta* Ulrich, Geol. Minnesota, 3, 1893, p. 168, pl. 12, figs. 5-29.—Grabau and Shimer, N. A. Index Fossils, 1, p. 156, fig. 208f.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 116, 117, fig. 44; Zittel-Eastman Textb. Pal., 1913, p. 344, fig. 504b.

*Ptilodictya* (*Escharopora*) *subrecta* Sardeson, Jour. Geol., 9, 1901, p. 159, pl. B, fig. 10.

Black River (Decorah): Minneapolis, etc., Minnesota; Decorah, Iowa; and Beloit, Wisconsin; Lake Nipissing, Ontario.

Ordovician (Wassaleem): Uxnorn, Esthonia, Russia.

*Cotypes*.—Cat. Nos. 43818, 43819, U.S.N.M.

**ETAGRAPTUS** Ruedemann. See *Tetragraptus* subgenus *Etagraptus*.

**ETHMOPHYLLUM MINGANENSIS** Walcott. See *Archæoscyphia minganensis*.

**EUCALYPTOCRINITES** Goldfuss. See *Eucalyptocrinus* Goldfuss.

**EUCALYPTOCRINITES CONICUS** Troost. See *Eucalyptocrinus milliganæ*.

**EUCALYPTOCRINITES CRENATUS** Troost. See *Eucalyptocrinus ventricosus*.

**EUCALYPTOCRINITES FLORIDUS** Troost. See *Eucalyptocrinus milliganæ*.

**EUCALYPTOCRINITES LÆVIS** Troost. See *Eucalyptocrinus phillipsi*.

**EUCALYPTOCRINITES TENNESSEÆ** Troost. See *Eucalyptocrinus ovalis*.

**EUCALYPTOCRINUS** Goldfuss.

Genotype: *E. rosaceus* Goldfuss.

*Eucalyptocrinites* Goldfuss, Petrefacta, 1826, p. 214, 2d ed., pt. I, 1862, p. 199; Agg. Mem. Soc. Sci. Nat. Neuch., 1, 1835, p. 197; Nova Acta Physico Med., Acad. Caes. Leop.-Carol., 19, 1839, p. 335.—Müller, Berlin Acad. Wiss., 1841, p. 210.—Roemer, Rhein. Ubergangsgeb., 1843, p. 64.—D'Orbigny, Prodrome Pal., 1, 1850, p. 45.

*Eucalyptocrinus* Agassiz, Ann. Nat. Hist., 1, 1838, p. 447.—Hall, Pal. New York, 2, 1852, p. 207.—Quenstedt, Handb. Petref., 1852, p. 624.—McCoy, British Pal. Rocks and Fossils, 1854, p. 57.—Roemer, Leth. Geog. (Ausg. 3), 1855, p. 257.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 306.—Bronn, Klass. Thierr. (Actin.), 1860, pl. 27.—Dujardin and Hupe, Hist. Nat. Zooph. Echin., 1862, p. 115.—Allman, Trans. Royal Soc. Edinburgh, 23, 1864, p. 249, text. fig. 5.—Hall, 15th Rep. New York State Cab. Nat. Hist., 1865, p. 32.—Schultze, Mon. Echin. Eifel. Kalk., 1866, p. 90.—Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 321, fig. 2; rev. ed. for 1868, 1870, p. 363, figs. 1-2.—Angelin, Icon. Crinoid., 1878, p. 16.—Hall, 28th Rep. New York State Cab. Nat. Hist., 2d ed., 1879, pls. 16-19.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 1879 (Apr.), No. 5, p. 7.—Zittel, Handb. Pal., 1, 1879, p. 379.—Etheridge and Carpenter, Ann. Mag. Nat. Hist., 5th ser., 7, 1881, p. 296.—Quenstedt, Handb. Petrefact., 1885, p. 963.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, p. 349 (Rev. Pal., pt. 3, sec. 1, p. 127).—Miller, N. A. Geol. Pal., 1889, p. 243; Amer. Geol., 6, 1890, p.



**EUCALYPTOCRINUS**—Continued.

- 347.—Bather, Treatise on Zool., 3, Echinoderma, London, 1900, p. 164.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 102, fig. 46.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 148.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 157; Bull. New York State Mus., 45, 1901, p. 157.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 45.—Zittel, Grundzüge Pal., 1, 1910, p. 164.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 557.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 192.
- Hypanthocrinites Phillips, in Murchison's Sil. Syst., 1839, p. 672, pl. 17, fig. 3.
- Hypanthocrinus Hall, Pal. New York, 2, 1852, p. 178.—Salter, Cat. Camb. Sil. Foss., 1873, p. 119.—Angelin, Icon. Crin., 1878, p. 17.—Zittel, Handb. Pal., 1, 1879, p. 380.—Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 141.

**EUCALYPTOCRINUS ARMOsus** McChesney. See *Siphonocrinus armosus*.

**Eucalyptocrinus asper** Weller.

- Eucalyptocrinus asper* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 110, pl. 5, figs. 4-7.
- Niagaran (Racine): Bridgeport and Hawthorne, Illinois.

**Eucalyptocrinus cælatus** (Hall).

- Hypanthocrinites cælatus Hall, Geol. New York, 4, 1843, p. 113, fig. 1; tab. 18, fig. 1.
- Eucalyptocrinus cælatus* D'Orbigny, Prodr. de Pal., 1, 1849, p. 45 (gen. ref.).—Hall, Pal. New York, 2, 1852, p. 210, pl. 47, figs. 4a-e.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 12.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 228, fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 336, pl. 83, figs. 5-7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559.
- Eucalyptocrinus papulosus* Hall, Pal. New York, 2, 1852, p. 211, pl. 47, figs. 5a, b.
- Clinton (Rochester): Lockport, Rochester, etc., New York.

**EUCALYPTOCRINUS CÆLATUS** Hall (1882). See *Eucalyptocrinus elrodi* and *E. ventricosus*.

**Eucalyptocrinus cælatus levis** Grabau and Shimer.

- Hypanthocrinites decorus Hall (not Phillips), Nat. Hist. New York, Geol., 4, 1843, p. 133, fig. 2, 3; p. 144; tab. ill. 18, fig. 2.
- Hypanthocrinus decorus Marcou, Geol. Map United States and British Prov., etc., 1853, p. 27, pl. 2, fig. 8.
- Eucalyptocrinus decorus* Hall, Pal. New York, 2, 1852, p. 207, pl. 47, fig. 1, 2a-h, 3a-d; p. 352, pl. 85, fig. 7.—Jones, Geol. Surv. Canada, dec. 3, 1858, p. 23, fig. 3.—Emmons, Manual Geol., 1860, p. 110, fig. 100.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, fig. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 229, figs.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 157, fig. 53; Bull. New York State Mus., 45, 1901, pp. 157, 158, fig. 53.
- Eucalyptocrinus cælatus* var. *levis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559, figs. 1893 and 1894.
- Clinton (Rochester): Lockport and Rochester, New York; Ontario.

**EUCALYPTOCRINUS CHICAGOENSIS** Winchell and Marcy. See *Eucalyptocrinus crassus*.

**EUCALYPTOCRINUS CONICUS** Shumard. See *Eucalyptocrinus milliganæ*.

**EUCALYPTOCRINUS CONSTRICTUS** Hall. See *Eucalyptocrinus crassus*.

**EUCALYPTOCRINUS CORNUTUS** Wachsmuth and Springer. See *Callicrinus cornutus*.

**EUCALYPTOCRINUS CORNUTUS** var. **EXCAVATUS** Hall. See *Callicrinus cornutus*.

**Eucalyptocrinus crassus** Hall.

*Eucalyptocrinus crassus* Hall, Trans. Albany Inst., 4, 1863, p. 197.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 129, pl. 6, fig. 11.—Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed. for 1875, 1877, pl. 17, figs. 1-11; pl. 18, figs. 1-9; pl. 19, figs. 2, 4, 5; pl. 21, fig. 6; pl. 31, fig. 5; mus. ed., 1879, p. 141, pl. 17, figs. 1-11; pl. 18, figs. 1-9; pl. 19, figs. 2, 4, 5.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, pl. 8, figs. 5-8; p. 7 footnote.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 495, pl. 3, fig. 1.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 272, pl. 17, figs. 1-11; pl. 18, figs. 1-9; pl. 19, figs. 2, 4, 5.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 189, fig.—Miller, N. A. Geol. Pal., 1889, p. 244, fig. 302.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 342, pl. 81, figs. 1-6, 14, 15.—Weller, Bull. Chicago Acad. of Sci., 4, 1900, p. 105, pl. 5, figs. 1, 2; p. 25, text fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559, fig. 1895.

*Eucalyptocrinus constrictus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 273, pl. 15, fig. 1; Trans. Albany Inst., 10, 1883, p. 66.

*Eucalyptocrinus chicagoensis* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 90, fig.

*Eucalyptocrinus* sp. undet. Worthen, Geol. Surv. Illinois, 6, 1875, pl. 24, figs. 2, 2a.

Niagaran: Waldron, etc., Indiana; Newsom, Tennessee (Waldron); Chicago, Illinois (Racine).

**EUCALYPTOCRINUS CRASSUS** Hall, 1867. See *Eucalyptocrinus nodulosus*.

**EUCALYPTOCRINUS DECORUS** of American authors. See *Eucalyptocrinus caelatus laevis*.

**Eucalyptocrinus depressus** Miller.

*Eucalyptocrinus depressus* Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 232, pl. 7, figs. 1-1b.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 114, pl. 7, figs. 5-7.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 349, pl. 83, figs. 3, 4a, 4b.

Niagaran (Racine): Cicero and Bridgeport, near Chicago, Illinois.

**Eucalyptocrinus egani** (Miller).

*Eucalyptocrinus* (*Hypanthocrinus*) *egani* Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 140, pl. 4, figs. 1-1c.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 108, pl. 7, fig. 4.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 352, pl. 82, figs. 11, 12.

Niagaran (Racine): Near Chicago, Illinois.

**Eucalyptocrinus ellipticus** Miller.

*Eucalyptocrinus ellipticus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 648, pl. 7, fig. 4 (adv. sheets, 1891, p. 38).

Niagaran (Waldron): Hartsville, Indiana.

**Eucalyptocrinus elrodi** Miller.

*Eucalyptocrinus elrodi* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 650, pl. 7, figs. 9, 10 (adv. sheets, 1891, p. 40); N. A. Geol. Pal., 2d App., 1897, p. 745, figs. 1351, 1352.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 339, pl. 81, fig. 7a, 8-13.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559, fig. 1896.



**Eucalyptocrinus elrodi**—Continued.

*Eucalyptocrinus caelatus* Hall, Trans. Alb. Inst., 4, 1863, p. 226; 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 321, fig. 1; p. 329; rev. ed., 1870, p. 366; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 16, figs. 1-10; pl. 19, figs. 1, 3, 6, 7; mus. ed., 1879, p. 142, pl. 16, figs. 1-10; pl. 19, figs. 1, 3; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 274, pl. 15, fig. 2; pl. 16, figs. 1-10; pl. 19, figs. 1, 3.

*Eucalyptocrinus subglobosus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 647, pl. 7, fig. 3 (adv. sheets, 1891, p. 37); N. A. Geol. Pal., 2d App., 1897, p. 745, fig. 1354.

Niagaran (Waldron): Hartsville and Waldron, Indiana; Newsom, Tennessee.

**Eucalyptocrinus extensus** (Troost).

*Eucalyptocrinites extensus* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Eucalyptocrinus extensus* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 49, pl. 13, figs. 9, 10.

Niagaran (Brownsport): Decatur County, Tennessee.

*Holotype*.—Cat. No. 39961, U.S.N.M.

**Eucalyptocrinus gibbosus** (Troost).

*Eucalyptocrinites gibbosus* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

*Eucalyptocrinus gibbosus* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 54, pl. 10, figs. 3, 4.

Niagaran (Brownsport): Decatur County, Tennessee.

*Holotype*.—Cat. No. 39959, U.S.N.M.

**Eucalyptocrinus goldfussi** (Troost).

*Eucalyptocrinites Goldfussi* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Eucalyptocrinus goldfussi* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 52, pl. 15, figs. 5, 6.

Niagaran (Brownsport): Decatur County, Tennessee.

*Holotype*.—Cat. No. 39953, U.S.N.M.

**EUCALYPTOCRINUS GORBYI** Miller. See *Eucalyptocrinus magnus*.

**Eucalyptocrinus inconspicuum** Ringueberg.

*Eucalyptocrinus inconspicuum* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 148, pl. 3, fig. 5.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 346, pl. 83, fig. 1, 2.

Niagaran (Lockport): Lockport, New York.

**Eucalyptocrinus inornatus** Weller.

*Eucalyptocrinus inornatus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 15, pl. 6, figs. 3, 4.

Niagaran (Racine): Bridgeport and Hawthorne, Illinois.

**EUCALYPTOCRINUS LAEVIS** Shumard. See *Eucalyptocrinus phillipsi*.

**Eucalyptocrinus lindahli** Wachsmuth and Springer.

*Eucalyptocrinus lindahli* Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 139; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 347, pl. 82, fig. 9.—Foerste, Jour. Geol., 11, 1903, p. 712.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 47, pl. 12, figs. 5, 6.

**Eucalyptocrinus lindahli**—Continued.

*Eucalyptocrinus wortheni* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 53, pl. 4, fig. 2.

*Eucalyptocrinites splendidus* Troost (not Hall and Whitfield), Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Niagaran (Brownsport): Wayne County, Tennessee.

*Plesiotype*.—Cat. No. 39962, U.S.N.M. (Troost's type of *E. splendidus*).

**Eucalyptocrinus magnus** Worthen.

*Eucalyptocrinus magnus* Worthen, Geol. Surv. Illinois, 6, 1875, p. 501, pl. 25, fig. 3.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 348, pl. 82, figs. 7, 8.—Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 116, pl. 6, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.

*Eucalyptocrinus gorbyi* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 649, pl. 7, figs. 5, 6 (adv. sheets, 1891, p. 39); N. A. Geol. Pal., 2d App., 1897, p. 745, fig. 1353.

Niagaran: Wayne County and Newsom, Tennessee (Waldron); Hawthorne, Illinois (Racine).

**Eucalyptocrinus milliganæ** Miller and Gurley.

*Eucalyptocrinites conicus* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

*Eucalyptocrinus conicus* Shumard, Trans. Acad. Sci. St. Louis, 2, No. 2, 1866, p. 370.

*Eucalyptocrinites floridus* Troost, MS., 1850.

*Eucalyptocrinus milliganæ* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 10, 1896, p. 88, pl. 5, figs. 4-6.

*Eucalyptocrinus milligani* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 558, fig. 1892.—Wood, Bull., U. S. Nat. Mus., 64, 1909, p. 50, pl. 5, fig. 13.

Niagaran (Brownsport): Decatur County, Tennessee.

*Plesiotypes*.—Cat. Nos. 39957, 39958, U.S.N.M. (Troost's type of *E. conicus* and *E. floridus*).

**Eucalyptocrinus muralis** Ringueberg.

*Eucalyptocrinus muralis* Ringueberg, Annals New York Acad. Sci., 5, 1890, p. 305, pl. 3, fig. 3.

Niagaran (Lockport-Gasport member): Lockport, New York.

**Eucalyptocrinus nashvillæ** (Troost).

*Eucalyptocrinites Nashvillæ* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Eucalyptocrinus nashvillæ* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 53, pl. 15, figs. 7, 8.

Niagaran (Brownsport): Decatur County, Tennessee.

*Holotype*.—Cat. No. 39955, U.S.N.M.

**Eucalyptocrinus nodulosus** Weller.

*Eucalyptocrinus nodulosus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 109, pl. 7, figs. 1-3.

*Eucalyptocrinus crassus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 323, pl. 11, fig. 2; rev. ed., 1870, p. 365, pl. 11, fig. 2.

Niagaran (Racine): Bridgeport and Romeo, Illinois.



**Eucalyptocrinus obconicus Hall.**

*Eucalyptocrinus obconicus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867 (extras, 1865), p. 323, pl. 11 (2), fig. 1; rev. ed. 1870, p. 365, pl. 11, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 353, pl. 83, fig. 13.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 109, pl. 7, fig. 8.—Slocum, Field Col. Mus., 2, Geol. Series, 1908, p. 301, pl. 86, figs. 1, 2.

Niagaran (Racine): Racine, Wisconsin; Chicago, Illinois.

**Eucalyptocrinus ornatus Hall.**

*Eucalyptocrinus ornatus* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 20.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 91.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1865), p. 329, pl. 11, figs. 4, 5; rev. ed., 1870, p. 366, pl. 11, figs. 4, 5.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 340, pl. 82, fig. 10.—Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 111, pl. 6, figs. 5, 6.

Niagaran (Racine): Racine, Wisconsin; Bridgeport and Romeo, Illinois.

**Eucalyptocrinus ovalis Hall.**

*Eucalyptocrinites ovalis* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Eucalyptocrinus ovatus* Hall (in error for *E. ovalis*), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 17, figs. 11, 12; mus. ed., 1879, p. 143, pl. 17, figs. 12, 13.

*Eucalyptocrinus ovalis* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1882, p. 275, pl. 17, figs. 12, 13.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 344, pl. 82, figs. 1–6.—Grabau, Amer. Jour. Sci., 16, 1903, p. 299.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 48, pl. 11, fig. 3.

*Eucalyptocrinites Tennesseeæ* Troost, Amer. Jour. Sci. Arts., 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.

Niagaran: Decatur and Perry Counties, Tennessee (Brownsport); Waldron and Hartsville, Indiana; Newsom, Tennessee (Waldron).

*Plesiotypes*.—Cat. No. 39952, U.S.N.M. (Troost's type of *E. ovalis*).

**EUCALYPTOCRINUS OVATUS Hall.** See *Eucalyptocrinus ovalis*.

**EUCALYPTOCRINUS PAPULOSUS Hall.** See *Eucalyptocrinus cælatus*.

**Eucalyptocrinus phillipsi (Troost).**

*Eucalyptocrinites lævis* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Eucalyptocrinus lævis* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.

*Eucalyptocrinites Phillipsii* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

*Eucalyptocrinus phillipsi* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 51, pl. 10, figs. 9, 10; pl. 13, figs. 2, 3, 4.

Niagaran (Brownsport): Decatur County, Tennessee.

*Holotype* and *plesiotype*.—Cat. Nos. 39964, 39966, U.S.N.M. (Troost's types of *E. lævis* and *E. phillipsi*).

**Eucalyptocrinus proboscoidalis Miller.**

*Eucalyptocrinus proboscoidalis* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 224, pl. 9, fig. 2.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 352, pl. 82, fig. 14.

Niagaran (Guelph): Pontiac, Ohio.

**EUCALYPTOCRINUS RAMIFER** Roemer. See *Callicrinus ramifer*.

**Eucalyptocrinus rotundus** Miller.

*Eucalyptocrinus rotundus* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 82, pl. 3, figs. 4, 4b.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 350.—Weller, Bull. Chicago Acad. Sci. Nat. Hist. Surv., 4, pt. 1, 1900, p. 113, pl. 5, fig. 3.

Niagaran (Racine): Near Chicago, Illinois.

**Eucalyptocrinus splendidus** Hall and Whitfield.

*Eucalyptocrinus splendidus* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 128, pl. 6, fig. 12.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 350.

Niagaran (Guelph): Springfield, Ohio.

**EUCALYPTOCRINUS SPLENDIDUS** Troost. See *Eucalyptocrinus lindahli*.

**Eucalyptocrinus springeri** Foerste.

*Eucalyptocrinus springeri* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 99, pl. 4, fig. 73.

Niagaran (Waldron): Newsom, Tennessee.

**EUCALYPTOCRINUS SUBGLOBOSUS** Miller. See *Eucalyptocrinus elrodi*.

**EUCALYPTOCRINUS TENNESSEÆ** Shumard. See *Eucalyptocrinus ovalis*.

**Eucalyptocrinus tuberculatus** Miller and Dyer.

*Eucalyptocrinus tuberculatus* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 36, pl. 2, figs. 9, 9a.—Miller, N. A. Geol. Pal., 1889, p. 244, fig. 303.—Wachsmuth and Springer, Mem. Mus. Zool. Harvard, 20, 1897, p. 337, pl. 83, figs. 8–10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.

Niagaran (Waldron): Waldron and Hartsville, Indiana; Newsom, Tennessee.

**Eucalyptocrinus turbinatus** Miller.

*Eucalyptocrinus turbinatus* Miller, Cincinnati Soc. Nat. Hist., 5, 1882, p. 82, pl. 3, figs. 5, 5a.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 351, pl. 82, fig. 13.—Weller, Bull. Chicago Acad. Sci. Nat. Hist. Surv., 4, pt. 1, 1900, p. 107, pl. 6, figs. 1, 2.

Niagaran (Racine): Near Chicago, Illinois.

**Eucalyptocrinus ventricosus** Wachsmuth and Springer.

*Eucalyptocrinus ventricosus* Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 341, pl. 83, figs. 11, 12.—Foerste, Jour. Geol., 11, 1903, p. 712.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 54.

*Eucalyptocrinus cælatus* Roemer (not Hall, 1843), Sil. Fauna West. Tennessee, Breslau, 1860, p. 48, pl. 4, figs. 3a–e.

*Eucalyptocrinites crenatus* Troost MS., 1850.

Niagaran (Brownsport): Decatur County, Tennessee.

*Plesiotype*.—Cat. No. 39956 U.S.N.M. (Troost's type of *E. crenatus*).

**EUCALYPTOCRINUS WORTHENI** Miller and Gurley. See *Eucalyptocrinus lindahli*.

**EUCHASMA** Billings.

Genotype: *Conocardium blumenbachi* Billings.

*Euchasma* Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 360.

**Euchasma blumenbachi** (Billings).

*Conocardium Blumenbachii* Billings, Canadian Nat. Geol., 4, 1859, p. 350; Geol. Canada, Geol. Surv. Canada, 1863, p. 113, fig. 22a, b.



**Euchasma blumenbachi**—Continued.

*Euchasma Blumenbachia* Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, pp. 220, 361, fig. 348.

Canadian: Mingan Islands, Canada; Port aux Choix, Table Head, and Cape Norman, Newfoundland (Quebec—G. H.).

**EUCHEIROCRINUS** Meek and Worthen. Genotype: *Cheirocrinus chrysalis* Hall.

*Eucheirocrinus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 73; Geol. Surv. Illinois, 5, 1873, pp. 443, 502.—Bather, Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, pp. 21, 61, fig. 13b; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 148, figs. 61, 62.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 154.—Springer, *ibid.*, 2d ed., 1913, p. 213.

*Cheirocrinus* Hall (not Eichwald), 13th Rep. New York State Cab. Nat. Hist., 1860, p. 122.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 358.—Meek and Worthen, Geol. Surv. Illinois, 5, 1873, p. 443.

*Calceocrinus* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 562.—Miller, N. A. Geol. Pal., 1889, p. 230; 2d App., 1897, p. 740.

*Proclivocrinus* Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 396, pl. 11, figs. 2, 4.—Bather, Ann. Mag. Nat. Hist., 6th Ser., 5, 1890, p. 332, pl. 14, fig. 10; Treatise on Zool. (Lankester), pt. 3, 1900, p. 148. (Genotype: *Calceocrinus radicleus* Ringueberg.)

**Eucheirocrinus chrysalis** (Hall).

*Cheirocrinus chrysalis* Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 123, figs. 1–5.

*Calceocrinus chrysalis* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 358.—Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 147, fig. 2; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 281, fig. 2.

*Proclivocrinus chrysalis* Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 399, pl. 10, figs. 7, 13.

*Cremacrinus chrysalis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

Clinton (Rochester): Lockport, New York.

**Eucheirocrinus radicleus** (Ringueberg).

*Calceocrinus radicleus* Ringueberg, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 120, pl. 5, figs. 3, 3a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 503.

*Cremacrinus radicleus* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

*Proclivocrinus radicleus* Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 397, pl. 10, fig. 6.

Clinton (Rochester): Lockport, New York.

Observation.—Probably the same as *E. chrysalis* (Hall).

**EUCONIA** Ulrich.

Genotypes: *Pleurotomaria etna* and *P. ramsayi* Billings.

*Euconia* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 953.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642.

**Euconia amphitrite** (Billings).

*Pleurotomaria Amphitrite* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 32. (Adv. sheets, 1862.)

*Euconia amphitrite* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).—Raymond, Ann. Carnegie Mus., 4, 1908, p. 216.

Chazy (Mingan): South Point of Large Island, Mingan Islands, Canada.

**Euconia beekmanensis** (Whitfield).

Pleurotomaria Beekmanensis Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 53, pl. 8, figs. 8-11.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 704, figs.—Koken, Neues Jahrb. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 478.

Euconia beekmanensis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).

Canadian (Beekmantown): Beekmantown, New York.

**Euconia etna** (Billings).

Pleurotomaria Etna Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 226, figs. 210, a, b.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 316, pl. 24, figs. 12, 13.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 62, figs. 12, 13.

Euconia etna Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642, fig. 873.

Canadian (Quebec—G, H): Cape Norman and Table Head, Newfoundland.

**Euconia? pervetusta** (Conrad).

Cyclostoma? pervetusta Conrad, Ann. Rep. New York State Geol. Surv., 1838, p. 113; *ibid.*, 1839, p. 65.

Pleurotomaria pervetusta Hall, Rep. Geol. 4th Dist., New York, 1843, p. 48, figs. 1, 2.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 300, figs. 1, 2.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 5, figs. 1, 2.—Hall, Pal. New York, 2, 1852, p. 12, pl. 4 (bis), figs. 3a-d.—Grabau, Bull. New York State Mus., 45, 1901, p. 213, fig. 143; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 213, fig. 143.

Euomphalus pervetustus Hall, Geol. New York, 4, 1843, p. 48, figs. 1, 2; tab. ill. 2, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 231.

Straparollus pervetustus D'Orbigny, Prodr. de Pal., 1, 1849, p. 30 (gen. ref.).

Cyclonema pervetusta Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 2, 1899, p. 162 (gen. ref.).

Euconia(?) pervetusta Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642, fig. 874.

Upper Medinan: Medina and Lockport, New York.

**Euconia ramsayi** (Billings).

Pleurotomaria Ramsayi Billings, Canadian Nat. Geol., 4, 1859, p. 351, figs. 3, 4; Geol. Canada, Geol. Surv. Canada, 1863, p. 117, figs. 26a, b.—Miller, N. A. Geol. Pal., 1889, p. 422, fig. 701.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 714, figs.

Euconia ramsayi Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642.

Canadian (Romaine): Mingan Islands, Canada.

**EUCRINUS** Agelin. See *Dimerocrinus* Phillips.

**EUGASTER** Hall. See *Eugasterella* Schuchert.

**EUGASTERELLA** Schuchert.

Genotype: *Eugaster logani* Hall.

*Eugaster* Hall (not Seville, 1839), 20th Rep. New York State Cab. Hist., 1868, p. 290; rev. ed., 1870, p. 332.—Zittel, Handb. Pal., 1, 1879, p. 444.—Stürtz, Neues Jahrb. Min., Geol. Pal., 2, 1886, p. 151; Palæontographica, 32, 1886, pp. 78, 83.—Miller, N. A. Geol. Pal., 1889, p. 244.—Stürtz, Verh. naturh. Ver. preuss. Rheinl., etc., 1893, p. 20.—Gregory, Proc. Zool. Soc. London, 1897, p. 1035.

*Eugasterella* Schuchert, in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 19; Bull. U. S. Nat. Mus., 88, 1915, p. 237.



**Eugasterella concinna** (Ringueberg).

*Eugaster concinnus* Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 8, pl. 1, fig. 3.

*Eugasterella*(??) *concinna* Schuchert, in Frech, Foss. Cat. 1, Anim., pt. 3, 1914, p. 19; Bull. U. S. Nat. Mus., 88, 1915, p. 239.

Clinton (Rochester): Lockport, New York.

**EUGYRICHNITES** Ami.

Genotype: *E. minutus* Ami.

*Eugyrichnites* Ami, Summary Rep. Geol. Surv. Canada, for 1904, 1905, p. 291.

**Eugyrichnites minutus** Ami.

*Eugyrichnites minutus* Ami, Summary Rep. Geol. Surv. Canada for 1904, 1905, p. 291.

Horizon uncertain: Tapley's Mill, near Woodstock, New Brunswick.

**EUNEMA** Salter. See *Trochonema* subgenus *Eunema*.

**EUNEMA HISTORICUM** Hudson. See *Gyronema historicum*.

**EUNEMA LEPTONOTUM** Raymond. See *Gyronema leptonotum*.

**EUNEMA?** **PAGODA** Salter. See *Ectomaria pagoda*.

**EUNEMA PRISCA** Billings. See *Ectomaria prisca*.

**EUNICITES** Ehlers.

Genotype: *E. avitus* Ehlers.

*Eunicites* Ehlers, Palæontographica, 17, 1868, p. 147.—Zittel, Handb. Pal., 1, 1880, p. 565.—Miller, N. A. Geol. Pal., 1889, p. 518.—Grabau and Shimer, N. A. Index Fossils, 1910, 2, p. 241.

**Eunicites chiromorphus** Hinde.

*Eunicites chiromorphus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 381, pl. 20, fig. 10.

Upper Medinan (Cataract): Toronto, Ontario.

**Eunicites clintonensis** Hinde.

*Eunicites clintonensis* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 381, pl. 19, fig. 21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 242, fig. 1532a.

Upper Medinan (Cataract): Toronto, Ontario.

**Eunicites confinis** Foerste.

*Eunicites confinis* Foerste, Amer. Geol., 2, 1888, p. 418, fig. 6; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 6.

Richmond (Elkhorn): Todds Fork, Clinton County, Ohio.

**Eunicites contortus** Hinde.

*Eunicites contortus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 375, pl. 18, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1530d.

Cincinnatian (Pulaski): Toronto, Ontario.

**Eunicites coronatus** Hinde.

*Eunicites coronatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 381, pl. 20, fig. 9.

Upper Medinan (Cataract): Toronto, Ontario.

**EUNICITES CRISTATUS** Miller. See *Arabellites cristatus*.

**Eunicites? digitatus** Hinde.

*Eunicites? digitatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 376, pl. 19, fig. 3.

Cincinnatian (Pulaski): Toronto, Ontario.

**Eunicites falcatus** Foerste.

*Eunicites falcatus* Foerste, Amer. Geol., 2, 1888, p. 418, fig. 5; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 5.

Richmond (Elkhorn): Todds Fork, Clinton County, Ohio.

**Eunicites gracilis** Hinde.

*Eunicites gracilis* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 376, pl. 19, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 242, fig. 1528c.

Cincinnatian (Pulaski): Toronto, Ontario.

**Eunicites paululus** Foerste.

*Eunicites paululus* Foerste, Amer. Geol., 2, 1888, p. 418, fig. 7; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 7.

Richmond (Elkhorn): Todds Fork, Clinton County, Ohio.

**Eunicites major** Hinde.

*Eunicites major* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 374, pl. 18, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1530a.

*Cenonites major* Miller, N. A. Geol. Pal., 1889, p. 519 (gen. ref.).

Cincinnatian (Pulaski): Toronto, Ontario.

**Eunicites perdentatus** Hinde.

*Eunicites perdentatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 375, pl. 18, fig. 6.

*Lumbriconereites perdentatus* Miller, N. A. Geol. Pal., 1889, p. 519 (gen. ref.).

Cincinnatian (Pulaski): Toronto, Ontario.

**Eunicites simplex** Hinde.

*Eunicites simplex* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 376, pl. 19, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 242, fig. 1528b.

Cincinnatian (Pulaski): Toronto, Ontario.

**EUNICITES (NEREIDAVUS) VARIANS** Hinde. See *Nereidavus varians*.

**EUNOA** Clarke.

Genotype: *E. accola* Clarke.

*Eunoa* Clarke, Bull. New York State Mus., 52, 1902, p. 606.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 377.

**Eunoa accola** Clarke.

*Eunoa accola* Clarke, Bull. New York State Mus., 52, 1902, p. 607, pls. 5, 6.

Canadian (Deepkill): Deepkill, Rensselaer County, New York.

**EUOMPHALOPTERUS** Roemer.

Genotype: *Euomphalus alatus* Hisinger.

*Euomphalopterus* Roemer, Leth. geog. 1, Leth. Pal., 1876, Atlas, Expl., pl. 14, fig. 9a.—Zittel, Handb. Pal., 2, 1882, p. 206.—Koken, Neues Jahrb. f. Min., Geol., Pal., 6 Beilage-Band, 1889, p. 438; Neues Jahrb. f. Min., Geol., Pal., 1, 1893, p. 15; Die Leitfossilien, Leipzig, 1896, p. 102, text fig. 80.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 932.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 629.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 527,



***Euomphalopterus alatus americanus* Kindle and Breger.**

*Euomphalopterus alatus* var. *americanus* Kindle and Breger, 28th Ann. Rep.

Dept. Geol. Nat. Res. Indiana, 1904, p. 459, pl. 13, fig. 6.

*Euomphalopterus alatus* var. Kindle and Breger, *ibid.*, 1904, p. 461.

Niagaran: Little Deer Creek, Carroll County, Indiana.

***Euomphalopterus alatus limatoideus* Kindle and Breger.**

*Euomphalopterus alatus* var. *limatoidea* Kindle and Breger, 28th Ann. Rep.

Dep. Geol. Nat. Res. Indiana, 1904, p. 461, pl. 14, fig. 4.

Niagaran: Delphi, Indiana.

***Euomphalopterus alatus obsoletus* Ulrich.**

*Euomphalopterus alatus-obsoletus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 934, figs. 5g-i.

Niagaran (Waldron): Waldron, Indiana.

***Euomphalopterus elora* (Billings).**

*Pleurotomaria Elora* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 343, fig. 348; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 154, fig. 135 (adv. sheets 1861).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 708, fig.—

Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, p. 74, pl. 11, figs. 5, 6.

*Euomphalopterus Elora* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 331.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 630, fig. 853.

Niagaran (Guelph): Elora, Ontario.

***Euomphalopterus halei* (Hall).**

*Pleurotomaria halei* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 34.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 109.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pp. 344, 364, pl. 15 (6), figs. 13, 14 (extras, 1865); rev. ed., 1870, p. 392, pl. 15, figs. 13, 14, p. 432.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 73, pl. 10, figs. 2, 2a.

*Eotomaria halei* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 69 (gen. ref.).

*Trochonema halei* Miller, N. A. Geol. Pal., 1889, p. 428 (gen. ref.).

*Euomphalopterus Halei* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 330 (gen. ref.).

Niagaran: Racine, Wisconsin; Bridgeport, Illinois (Racine); Durham, Ontario; and Wisconsin (Guelph).

***Euomphalopterus tyrrelli* Parks.**

*Euomphalopterus tyrrelli* Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 36.

Niagaran (Guelph): Severn River, Ontario.

***Euomphalopterus valeria* (Billings).**

*Pleurotomaria Valeria* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 169.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 23, pl. 4, figs. 1, 1a; *ibid.*, pt. 2, 1895, p. 71, pl. 11, figs. 2, 3.—Lesley, Geol. Surv. Penn-

sylvania, Rep. P 4, 1889, p. 721, figs.

*Euomphalopterus Valeria* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 4, 1906, p. 330 (gen. ref.).—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909,

p. 191, pl. 28.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 630, figs. 851h, j, 852.

Niagaran (Guelph): Gault, etc., Ontario; Ohio.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

**Euomphalopterus velaris** Whiteaves.

Pleurotomaria velaris Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 72, pl. 11, figs. 4, 4a.

Euomphalopterus velaris Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 330 (gen. ref.).

Pleurotomaria cf. velaris Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 193, pl. 23, figs. 1-2.

Niagaran (Guelph): Elora, Ontario.

?Upper Monroan (Anderdon): Near Amherstburg, Ontario.

**EUOMPHALUS** McCoy.

Genotype: *E. pentagonalis* McCoy.

Euomphalus McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 34.—Brown, Illust. Foss. Conch. Great Britain and Ireland, 1849, p. 81.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 211.—Woodward, Man. Mollusca, pt. 1, 1851, p. 145.—McCoy, British Pal. Rocks Foss., 1854, p. 297.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 153.—Goldfuss, Petrefacta Germ., 2d ed., pt. 3, 1863, p. 75.—Meek and Worthen, Geol. Surv. Illinois, 2, p. 158.—Waagen, Mem. Geol. Surv. India, Pal. Indica, ser. 13, 1, p. 86.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 136.—Koninck, Ann. d. Mus., Royal d'Hist. Nat. de Belgique, 6, 1881, p. 136.—Zittel, Handb. Pal., 2, 1882, p. 206.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 181.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6 Beilage-Band, 1889, p. 317.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1891, p. p. 244.—Koken, Die Leitfossilien, Leipzig, 1896, p. 104, fig. 86, p. 106.—Pilsbry, Zittel-Eastman Textb. Pal., 1900, p. 446.—Dall, ibid., 2d ed., 1913, p. 527.

**EUOMPHALUS** (part) of authors. See *Eccyliopterus* Remele and *Oxydiscus* Koken, and *Poleumita* Clarke and Ruedemann.

**EUOMPHALUS ALATUS** var. **LIMATOIDEA** Kindle and Breger. See *Euomphalopterus alatus limatoideus*.

**EUOMPHALUS CALCIFERUS** Whitfield. See *Eccyliomphalus calciferus*.

**EUOMPHALUS CIRCINATUS** Whiteaves. See *Eccyliomphalus circinatus*.

**Euomphalus?? circumliratus** Whitfield.

Euomphalus circumliratus Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 308, pl. 24, figs. 18-21.—Seely, Vermont State Geol., Rep., 7, 1910, pl. 62, figs. 18-21.

Canadian (Beekmantown): Fort Cassin, Vermont.

**Euomphalus expansus** Conrad.

Not recognized.

Euomphalus expansus Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 273.

Niagaran: Near Rome, New York, and Pendleton, Indiana.

**Euomphalus fairchildi** Clarke and Ruedemann.

Euomphalus fairchildi Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 75, pl. 8, figs. 3, 4.

Euomphalus cf. fairchildi Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 186, pl. 16, fig. 28.

Niagaran (Guelph): Rochester, New York.

?Upper Monroan (Lucas): Detroit, Michigan.



• **Euomphalus galtensis** Whiteaves.

*Euomphalus galtensis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 21, pl. 3, figs. 9, 9a; *ibid.*, pt. 2, 1895, p. 85.

Niagaran (Guelph): Galt, Hespeler, and Durham, Ontario.

**EUOMPHALUS GYROCERAS** Roemer. See *Eccyliomphalus gyroceras*.

**EUOMPHALUS HEMISPHERICUS** Hall. See *Diaphorostoma hemisphericum*.

**Euomphalus inornatus** (Whiteaves).

*Trochonema inornatum* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 19, pl. 3, fig. 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1230, fig.

*Euomphalus inornatus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 85, pl. 13, fig. 1.

Niagaran (Guelph): Elora and Durham, Ontario.

**EUOMPHALUS MACLURII** Troost. See *Maclurites magnus*.

**EUOMPHALUS MACROLINEATUS** Whitfield. See *Poleumita macrolineata*.

**EUOMPHALUS MICHLERANUS** Hall. See *Eccyliopteris? michleranus*.

**EUOMPHALUS MINNESOTENSIS** Miller. See *Raphistoma minnesotense*.

**Euomphalus? minutissimus** Castelnau.

*Euomphalus? minutissimus* Castelnau, Essai Syst. Sil. l'Amerique Septent, 1843, p. 35, pl. 11, fig. 9.

Ordovician?: Trenton, New York.

Observation.—Not recognized. Probably internal cast of some small shell.

**EUOMPHALUS (STRAPAROLLUS?) MOPSUS** Whitfield. See *Straparollus mopsus*.

**EUOMPHALUS PEPINENSIS** Meek. See *Raphistoma pepinensis*.

**EUOMPHALUS PERKINSI** Whitfield. See *Eccyliomphalus perkinsi*.

**Euomphalus pervetus** (Conrad).

Not recognized.

*Inachus pervetus* Conrad, Proc. Acad. Nat. Sci., Philadelphia, 1843, p. 334.

*Euomphalus pervetus* Miller, N. A. Geol. Pal., 1889, p. 404.

Lead-bearing limestone: Mineral Point, Wisconsin.

**EUOMPHALUS PERVETUSTUS** Hall. See *Euconia? pervetusta*.

**EUOMPHALUS POLYGYRATUS** Roemer. See *Polygyrata polygyratus*.

**EUOMPHALUS (RAPHISTOMA) ROTULIFORMIS** Meek. See *Polygyrata rotuliformis*.

**EUOMPHALUS (CYCLONEMA) RUGÆLINEATA** Hall and Whitfield. See *Poleumita rugilineata*.

**EUOMPHALUS SANCTISABÆ** Roemer. See *Straparollus sanctisabæ*.

**EUOMPHALUS SINUATUS** Hall. See *Straparollus sinuatus*.

**EUOMPHALUS STRONGI** Whitfield. See *Sinuopea strongi*.

**EUOMPHALUS SULCATUS** Hall. See *Poleumita? sulcata*.

**Euomphalus triliratus** Conrad.

Not recognized.

*Euomphalus triliratus* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 333.

Trenton: Mineral Point, Wisconsin.

**EUOMPHALUS (RAPHISTOMA?) TROCHISCUS** Meek. See *Polygyrata trochiscus*.

**EUOMPHALUS UNIANGULATUS** Hall. See *Helicotoma uniangularata*.

**EUOMPHALUS? VATICINUS** Hall. See *Raphistoma minnesotense*.

**Euomphalus verneuili** Castelnau.

*Euomphalus Verneuili* Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1843, p. 34, pl. 11, figs. 1a, b.

Silurian: Northern shore of Lake Huron.

**Euomphalus winonensis** Sardeson.

*Euomphalus winonensis* Sardeson, *Bull. Minnesota Acad. Nat. Sci.*, 4, 1896, p. 96, pl. 6, fig. 1.

Ozarkian (Oneota): Near Dresbach, Winona County, and near Red Wing, Goodhue County, Minnesota; Blanchardville, Wisconsin.

**EURYCHILINA** Ulrich.

Genotype: *E. reticulata* Ulrich.

*Eurychilina* Ulrich, *Cont. Micro-Pal., Geol. Surv. Canada*, pt. 2, 1889, p. 52.—Vogdes, *Annals New York Acad. Sci.*, 5, 1889, facing p. 36.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, pt. 1, 1890, pp. 125, 126.—Jones, *Quart. Jour. Geol. Soc. London*, 46, 1890, p. 538.—Miller, *N. A. Geol. Pal.*, 1st App., 1892, p. 707.—Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 658; *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 644.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1040.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 348.—Bassler, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 738.

**Eurychilina æqualis** Ulrich.

*Eurychilina æqualis* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 129, pl. 9, figs. 5-8.

*Eurychilina equalis* Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 348 figs. 1657q-s.

Stones River (Ridley?): Bottom of gorge at High Bridge, Kentucky; Lebanon, Tennessee.

*Cotypes*.—Cat. No. 41639, U.S.N.M.

**Eurychilina billingsi** (Jones).

*Primitia billingsi* Jones, *Quart. Jour. Geol. Soc. London*, 46, 1890, p. 547, pl. 21, fig. 10.

Anticostian (Gun River and Jupiter River): West of Jupiter River, Anticosti.

**Eurychilina bulbifera** Ruedemann.

*Eurychilina bulbifera* Ruedemann, *Bull. New York State Mus.*, 49, 1901, p. 76, pl. 5, figs. 14-17.

Mohawkian (Rysedorph): Rysedorph Hill, Rennselaer County, New York.

**Eurychilina dianthus** Ruedemann.

*Eurychilina dianthus* Ruedemann, *Bull. New York State Mus.*, 49, 1901, p. 78, pl. 5, figs. 1, 2, 8, 9.

Mohawkian (Rysedorph): Rysedorph Hill, Rennselaer County, New York.

**Eurychilina frobisheri** (Emerson).

*Primitia frobisheri* Emerson, *Narrative Hall's Sec. Arctic Exped., U. S. Navy Dep.*, 1879, p. 581, fig. 8.

Richmond: Frobisher Bay, Baffin Land.

*Plastotype*.—Cat. No. 60728, U.S.N.M.



**Eurychilina granosa** Ulrich.

*Eurychilina granosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 128, pl. 9, figs. 9-12.

Stones River (Ridley?): Bottom of gorge at High Bridge, Kentucky.

*Cotypes*.—Cat. No. 41616, U.S.N.M.

**Eurychilina jerseyensis** Weller.

*Eurychilina jerseyensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 210, pl. 13, fig. 17.

Trenton: Near Iliffs Pond, New Jersey.

**Eurychilina latimarginata** (Raymond).

*Primitia latimarginata* Raymond, Amer. Jour. Sci., 20, 1905, p. 380.

*Eurychilina latimarginata* Raymond, Ann. Carnegie Mus., 7, No. 2, 1911, p. 255, fig. 26.

Chazy: Chazy, Valcour Island, Crown Point, etc., New York (Day Point, Valcour); East Tennessee (Lenoir).

**Eurychilina longula** Ulrich.

*Eurychilina longula* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 127, pl. 9, figs. 3a, b, 4.

Black River (Lowville): High Bridge, Kentucky.

*Cotypes*.—Cat. No. 41623, U.S.N.M.

**Eurychilina manitobensis** Ulrich.

*Eurychilina manitobensis* Ulrich, Geol. Surv. Canada, Cont. Micro-Pal., pt. 2, 1889, p. 53, pl. 9, figs. 10, 10a.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 127 (loc. occ.)

Richmond (Stony Mountain): Stony Mountain, Manitoba; Wyoming.

**Eurychilina obesa** Ulrich.

*Eurychilina obesa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 129, pl. 9, fig. 13.

Black River (Lowville): High Bridge, Kentucky.

*Holotype*.—Cat. No. 41624, U.S.N.M.

**Eurychilina obliqua** Ruedemann.

*Eurychilina obliqua* Ruedemann, Bull. New York State Mus., 49, 1901, p. 79, pl. 5, figs. 10-12.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Eurychilina oculifera** Weller.

*Eurychilina oculifera* Weller, Geol. Surv. New Jersey, 3, 1903, p. 210, pl. 13, fig. 16.

Trenton: Near Iliffs Pond, New Jersey.

**Eurychilina reticulata** Ulrich.

*Eurychilina reticulata* Ulrich, Cont. Micro-Pal., Geol. Surv. Canada, pt. 2, 1889, p. 52, pl. 9, figs. 9, 9a; Geol. Minnesota, 3, pt. 2, 1894, p. 660, pl. 44, fig. 1.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 76, pl. 5, fig. 3.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 298, fig. 46.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 348, fig. 1657p.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425g.

Mohawkian: Minneapolis, St. Paul, etc., Minnesota (Black River-Decorah); Rysedorph Hill, New York (Rysedorph).

*Cotypes and plesiotypes*.—Cat. Nos. 44600, 44601, U.S.N.M.

**Eurychilina reticulata incurva** Ulrich.

*Eurychilina reticulata incurva* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 661, pl. 44, fig. 2.

Black River (Decorah): St. Paul, Minnesota.

*Holotype*.—Cat. No. 41599, U.S.N.M.

**Eurychilina? solida** Ruedemann.

*Eurychilina? solida* Ruedemann, Bull. New York State Mus., 49, 1901, p. 77, pl. 5, fig. 18.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Eurychilina? striatomarginata** (Miller).

*Beyrichia striato-marginatus* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 233, fig. 26; N. A. Geol. Pal., 1889, p. 535, fig. 979.

*Eurychilina striatomarginata* Ulrich, Cont. Micro-Pal., Geol. Surv. Canada, pt. 2, 1889, p. 52; Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 130, pl. 9, fig. 14; Geol. Minnesota, 3, pt. 2, 1894, p. 659.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1046, pl. 13, fig. 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 348, fig. 1657t.

Richmond (Whitewater—Saluda): Osgood, etc., Indiana.

*Plesiotype*.—Cat. No. 41615, U.S.N.M.

**Eurychilina? subæquata** Ulrich.

*Eurychilina? subæquata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 663, pl. 45, figs. 7–9.

Black River (Decorah): St. Paul, Minnesota.

*Holotype*.—Cat. No. 41628, U.S.N.M.

**Eurychilina subradiata** Ulrich.

*Eurychilina subradiata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 126, pl. 9, figs. 1a–c, 2a–c; Geol. Minnesota, 3, pt. 2, 1894, p. 661, pl. 4, figs. 3, 4, 4a.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 299, fig. 49.—Ruedemann, Bull. New York State Mus., 162, 1912, pl. 9, fig. 16.

Stones River: Lebanon, Tennessee.

Black River: Dixon, Illinois, etc. (Platteville); Minneapolis, Minnesota (Decorah).

Trenton (Canajoharie): Canajoharie, New York.

*Cotypes* and *plesiotypes*.—Cat. Nos. 41611, 41613, 41614, U.S.N.M.

**Eurychilina subradiata rensselaerica** Ruedemann.

*Eurychilina subradiata rensselaerica* Ruedemann, Bull. New York State Mus., 49, 1901, p. 77, pl. 5, figs. 4–7, 13.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Eurychilina symmetrica** Ulrich.

*Eurychilina symmetrica* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 663, pl. 44, figs. 5–7; pl. 45, figs. 4–6.

Black River (Decorah): St. Paul and near Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 41386, U.S.N.M.

**Eurychilina ventrosa** Ulrich.

*Eurychilina ventrosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 662, pl. 45, figs. 1–3.

Trenton (Prosser): Near Cannon Falls and Kenyon, Minnesota.

*Cotype*.—Cat. No. 41625, U.S.N.M.



**EURYDICTYA** Ulrich.Genotype: *E. montifera* Ulrich.

*Eurydicta* Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 389, 520.—(Ulrich in press), Miller, N. A. Geol. Pal., 1889, p. 301.—Ulrich, Geol. Minnesota, 3, 1893, p. 138.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 17.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 527.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 48.

***Eurydictya calhounensis* Ulrich.**

*Eurydictya calhounensis* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 520, pl. 30, figs. 4-4c.

Black River (Kimmswick): Three miles north of Cap au Gres, Calhoun County, Illinois.

Sections of *holotype*.—Cat. No. 43754, U.S.N.M.

***Eurydictya montifera* Ulrich.**

*Eurydictya montifera* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 521, pl. 30, figs. 3-3d.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 80-82 (p. 528).

Richmond (Fernvale): Wilmington, Illinois.

Fragment of *holotype*.—Cat. No. 43753, U.S.N.M.

***Eurydictya multipora* (Hall).**

*Phænopora multipora* Hall, Foster and Whitney's Rep. Geol. Lake Superior Land District, pt. 2, 1851, p. 206, pl. 24, figs. 1a, b.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 171, pl. 8, figs. 7-7b.

*Eurydictya multipora* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 520; Geol. Minnesota, 3, 1893, p. 139, pl. 6, 9-11; pl. 14, 9-11 (not pl. 7, 24, 29-31=*Rhinidictya fidelis* Ulrich).—Nickles and Bassler, U. S. Geol. Surv., 173, 1900, p. 241.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 38, pl. 1, figs. 11, 12.

*Ptilodictya antiqua* James, Paleontologist, 5, 1881, p. 37.

Black River and Trenton: Escanaba River, Michigan; Burgin, Kentucky; Nashville, Tennessee; St. Paul, Minnesota.

*Plesiotypes*.—Cat. No. 43604, U.S.N.M.

**EURYDICTYA MULTIPORA** (in part) Ulrich. See *Rhinidictya fidelis*.

***Eurydictya sterlingensis* Ulrich.**

*Eurydictya sterlingensis* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 522, pl. 30, figs. 2, 2a.

Richmond (Maquoketa): Sterling and South Elgin, Illinois.

**EURMYA** Ulrich.Genotype: *Modiolopsis plana* Hall.

*Eurymya* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 512.—Sardeson, Amer. Geol., 30, 1902, p. 39.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 517.

***Eurymya alata* (Ulrich).**

*Modiolopsis alata* Ulrich, Amer. Geol., 5, 5, 1890, p. 280, figs. 8a-c.

*Eurymya alata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 512 (gen. ref.).

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 46201, U.S.N.M.

***Eurymya plana* (Hall).**

*Modiolopsis plana* Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 30; Geol. Wisconsin, 1, 1862, pp. 38 and 438, fig. 6.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 156, fig.—Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 224, fig.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 56, pl. 7, figs. 12, 13 (?14, 15).—Sardeson, Amer. Geol., 30, 1902, p. 40, figs. 1-9.

**Eurymya plana**—Continued.

- Eurymya plana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 512, pl. 36, figs. 27, 28.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518, figs. 696a, b.  
 Black River (Platteville): Beloit, Janesville, Mineral Point, etc., Wisconsin; Minneapolis, St. Paul, etc., Minnesota.  
*Plesiotypes*.—Cat. No. 46202, U.S.N.M.

**Eurymya subplana** Ulrich.

- Eurymya subplana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 513.  
 Trenton (Hermitage): Central Tennessee and Mercer County, Kentucky.  
*Cotypes*.—Cat. No. 46203, U.S.N.M.

**EURMYA?** TRUNCATA Ulrich. See *Modiolodon truncata*.

**EURMYELLA** Williams.

Genotype: *E. shaleri* Williams.

- Eurmyella* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 382.

**Eurmyella angularis** Williams.

- Eurmyella angularis* Williams, Proc. U. S. Nat. Mus., 1912, p. 387, pl. 49, figs. 10, 11.  
 Silurian (Eastport): East side Seward Neck, Washington County, Maine.  
*Holotype* and *paratype*.—Cat. No. 58437, U.S.N.M.

**Eurmyella convexa** Williams.

- Eurmyella convexa* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 389, pl. 50, fig. 10.  
 Silurian (Eastport): Salt works, Eastport, Maine.  
*Holotype*.—Cat. No. 58448, U.S.N.M.

**Eurmyella denbowensis** Williams.

- Eurmyella denbowensis* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 390, pl. 50, figs. 11–14.  
 Silurian (Pembroke): Denbow Point, Washington County, Maine.  
*Holotype* and *paratype*.—Cat. No. 58449, U.S.N.M.

**Eurmyella plana** Williams.

- Eurmyella plana* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 388, pl. 49, fig. 14.  
 Silurian (Eastport): East side of Seward Neck, Washington County, Maine.  
*Holotype*.—Cat. No. 58439, U.S.N.M.

**Eurmyella recta** Williams.

- Eurmyella recta* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 389, pl. 49, fig. 15.  
 Silurian (Eastport): East side of Seward Neck, Washington County, Maine.  
*Holotype*.—Cat. No. 58440, U.S.N.M.

**Eurmyella shaleri** Williams.

- Eurmyella shaleri* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 385, pl. 49, figs. 1–4.  
 Silurian (Eastport): Moose Island, etc., Washington County, Maine.  
*Cotypes*.—Cat. Nos. 58431–58433, U.S.N.M.

**Eurmyella shaleri breva** Williams.

- Eurmyella shaleri* var. *breva* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 386, pl. 49, figs. 5–7.  
 Silurian (Eastport): Moose Island, etc., Washington County, Maine.  
*Cotypes*.—Cat. No. 58434, U.S.N.M.



**Eurymyella shaleri longa** Williams.

*Eurymyella shaleri* var. *longa* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 397, pl. 49, fig. 8.

Silurian (Eastport): Moose Island, etc., Washington County, Maine.

*Holotype*.—Cat. No. 58435, U.S.N.M.

**Eurymyella shaleri minor** Williams.

*Eurymyella shaleri* var. *minor* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 387, pl. 49, fig. 9; *ibid.*, 45, 1913, p. 346, pl. 31, fig. 5.

Silurian (Eastport): Sipps Bay, south of highway bridge, Washington County, Maine.

*Holotype* and *plesiotype*.—Cat. Nos. 58436, 58972, U.S.N.M.

**Eurymyella? simulans** Williams.

*Eurymyella? simulans* Williams, Proc. U. S. Nat. Mus., 1912, p. 388, pl. 49, figs. 12, 13.

Silurian (Eastport): East side of Seward Neck, Washington County, Maine.

*Cotypes*.—Cat. No. 58438, U.S.N.M.

**EURYPTERUS** DeKay.

Genotype: *E. remipes* DeKay.

*Eurypterus* DeKay, Annals Lyceum Pal. New York, 1, 1825, p. 375.—Harlan, Medical, Physical Res., 1835, p. 297.—Hibbert, Trans. Royal Soc. Edinburgh, 13, 1836, p. 281.—Conrad, 1st Ann. Rep. New York Geol. Surv., 1837, p. 182.—Fischer de Waldheim, Bull. Soc. geol. France, 11, 1840, p. 368.—Edwards, Hist. Nat. d. Crustaces, 3, 1840, p. 422.—Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 38.—Roemer, Palæontographica, 1, 1848, pp. 192–193.—McCoy, British Pal. Rocks Fossils, 1854, p. 175.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 529.—Salter, Quart. Jour. Geol. Soc. London, 12, 1856, p. 27.—Nieszkowski, Archiv. f. Naturk. Liv.-Ehst-u. Kurl., 1858, 2, p. 308.—Hall, Pal. New York, 3, 1859, 1861, pp. 382; 385; 392; 395; 397, figs. 1, 2; 398, fig. 3; 400, fig. 5; 403, figs. 6, 7.—Woodward, Mon. British Foss. Crust., Pal. Soc., 1872, p. 132.—Barrande, Syst. Sil. du Centre Bohème, 1, Suppl., 1872, p. 563.—Alth, Abhandl. der K.-K. Geol. Reichsanstalt, 7, Heft 1, 1874, p. 54.—Hall and Clarke, Pal. New York, 7, 1888, p. 49.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersb., 7 ser., 31, 5, 1883, p. 48.—Zittel, Handb. Pal., 2, 1885, p. 647.—Miller, N. A. Geol. Pal., 1889, p. 548.—Vogdes, Annals New York Acad. Sci., 1889, p. 20, pl. 1, fig. 7.—Laurie, Trans. Royal Soc. Edinburgh, 37, 1893, p. 517; Nat. Sci., 2, 1893, p. 125; *ibid.*, 3, 1893, p. 125.—Clarke, Zittel-Eastman Textb. Pal. 1, 1900, p. 674.—Grabau, Bull. New York State Mus., 45, 1901, p. 228.—Clarke, 54th Rep. New York State Mus., 1901, p. 83.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 228.—Clarke, Bull. New York State Mus., 107, 1907, p. 304.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 405.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 155.—Clarke, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 782.

*Onychopterus* (subgenus of *Eurypterus*) Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 212.—Clarke, Zittel-Eastman Textb. Pal., 1913, p. 782. (Genotype: *Eurypterus kokomoensis* Miller and Gurley).

*Tylopterus* (subgenus of *Eurypterus*) Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 216.—Clarke, Zittel-Eastman Textb. Pal., 1913, p. 783. (Genotype: *Eurypterus boylei* Whiteaves).

**Eurypterus (Tylopterus) boylei** (Whiteaves).

*Eurypterus Boylei* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 42, pl. 7, fig. 3; *ibid.*, pt. 2, 1895, p. 109 (loc. occ.)

**Eurypterus (Tylopteris) boylei**—Continued.

*Tylopteris boylei* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 218, fig. 42.

Niagaran (Guelph): Elora, Ontario.

**EURYPTERUS? CESTROTUS** Clarke. See *Stylonurus* (*Ctenopteris*) *cestrotus*.

**Eurypterus chadwicki** Clarke and Ruedemann.

*Eurypterus chadwicki* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 413, fig. 95.

Chazyan (Normanskill): Catskill, New York.

**EURYPTERUS CICEROPS** Clarke. See *Eusarcus* (?) *cicerops*.

**EURYPTERUS? CLEVELANDI** Walcott. See *Echinognathus clevelandi*.

**Eurypterus dekayi** Hall.

*Eurypterus dekayi* Hall, Pal. New York, 3, 1859, p. 411, pl. 82, fig. 1.—Grabau, Bull. New York State Mus., 45, 1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 409.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 181, pl. 19, fig. 2; pl. 20, fig. 1.

Cayugan (Bertie): Buffalo, New York.

**EURYPTERUS ERIENSIS** Whitfield. See *Eurypteris microphthalmus*.

**EURYPTERUS GIGANTEUS** Pohlman. See *Eurypteris pustulosus*.

**Eurypteris (Onychopteris) kokomoensis** (Miller and Gurley).

*Eurypteris kokomoensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 10, 1896, p. 90, pl. 5, fig. 1.

*Eurypteris* (*Onychopteris*) *kokomoensis* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 212, pl. 25, figs. 1, 2; pl. 26, fig. 2.

Cayugan (Kokomo): Kokomo, Indiana.

**Eurypteris lacustris** Harlan.

*Eurypteris lacustris* Harlan, Trans. Geol. Soc. Pennsylvania, 1, 1834, p. 98, pl. 5, fig. 2; Medical, Physical Res., 1835, p. 298, pl. 5, fig. 2.—Hibbert, Trans. Royal Soc. Edinburgh, 13, 1836, p. 281, pl. 12, fig. 6.—Edwards, Hist. Nat. d. Crustacees, 3, 1840, p. 422.—Fischer de Waldheim, Bull. Soc. Geol. France, 11, 1840, p. 368.—Hall, Pal. New York, 3, 1859, p. 400, text fig. 5; p. 407, pl. 81, figs. 1–11; pl. 81A, fig. 1; pl. 81B, figs. 1–5; pl. 83B, fig. 3.—Grabau, Bull. New York State Mus., 45, 1901, p. 229; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 408, fig. 1708.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 173, pls. 9–12; pl. 13, fig. 3; figs. 35, 36.

*Eurypteris robustus* Hall, Pal. New York, 3, 1859, p. 410, pl. 81C, fig. 1; also see corrigenda, p. 533.—Grabau, Bull. New York State Mus., 45, 1901, p. 229; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 408, fig. 1710.

*Eurypteris remipes* Bronn and Roemer, Leth., 3d ed., 2, 1854, p. 666, pl. 9, fig. 1. Cayugan (Bertie): Williamsville, Buffalo, Black Rock, Erie County, and Union Springs, Cayuga County, New York; Bertie, Ontario.

**Eurypteris lacustris pachycheirus** (Hall).

*Eurypteris pachycheirus* Hall, Pal. New York, 3, 1859, p. 412, pl. 82, figs. 1–3.—Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1881, p. 19, fig. 7.—Grabau, Bull. New York State Mus., 45, 1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.



**Eurypterus lacustris pachycheirus**—Continued.

*Eurypterus lacustris* var. *pachycheirus* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 179, pl. 12, fig. 3; pl. 19, fig. 1.

Cayugan (Bertie): Buffalo and Black Rock, New York.

**Eurypterus maria** Clarke.

*Eurypterus maria* Clarke (part) Bull. New York State Mus., 107, 1907, p. 305, pl. 1, figs. 1, 2, 4; pl. 2, figs. 2, 4, 7; pl. 3, figs. 1-5, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 406, figs. 1705a-c, 1713d-e.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 184, pls. 21, 22, fig. 37. Medinan (Shawangunk): Otisville, New York, and Delaware Water Gap, Pennsylvania.

**EURYPTERUS MARIA** (part) Clarke. See *Pterygotus* (*Erettopterus*) *globiceps* and *Stylonurus myops*.

**Eurypterus megalops** Clarke and Ruedemann.

*Eurypterus megalops* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 191, pl. 83, fig. 7.

Trenton (Schenectady): Near Rotterdam Junction, Schenectady County, New York.

**Eurypterus microphthalmus** Hall.

*Eurypterus microphthalmus* Hall, Pal. New York, 3, 1859, p. 407, pl. 80A, fig. 7.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 192, pl. 20, figs. 2-10.

*Eurypterus Eriensis* Whitfield, Annals New York Acad. Sci., 2, 1882, p. 196.—Claypole, Proc. Amer. Phil. Soc., 21, 1883, p. 239.—Whitfield, Geol. Surv. Ohio, Pal., 7, 1893, p. 416, pl. 1, figs. 31, 32; Ann. New York Acad. Sci., 5, 1891, p. 515, pl. 5, figs. 31, 32.—Grabau and Shimer, N. A. Index Fossils, 1, 1910, p. 407, fig. 1707.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 208, pl. 30, figs. 31-32.

Cayugan: Drift boulder near Cazenovia; also Onondaga, Litchfield, Cherry Valley, and Manlius village, New York (top of Manlius); Put-in-Bay, Lake Erie (Put-in-Bay).

**EURYPTERUS MYOPS** Clarke. See *Stylonurus myops*.

**EURYPTERUS PACHYCHEIRUS** Hall. See *Eurypterus lacustris pachycheirus*.

**Eurypterus pittsfordensis** Sarle.

*Eurypterus pittsfordensis* Sarle, Bull. New York State Mus., 69, 1902, p. 1098, pl. 10, fig. 7; pl. 15, figs. 1-3; pls. 16-23; pl. 24, figs. 2-5; pl. 25, figs. 2, 5, 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 407, fig. 1706.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 196, pl. 13, figs. 4-6; pls. 14-16; pl. 17, figs. 1-6; pl. 18, figs. 3-8.

Cayugan (Pittsford): Pittsford, Monroe County, New York.

**Eurypterus pristinus** Clarke and Ruedemann.

*Eurypterus pristinus* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 207, pl. 83, figs. 5, 6.

Trenton (Schenectady): Dettbarn quarry, Schenectady, New York.

**Eurypterus? (Dolichopterus?) prominens** Hall.

*Eurypterus prominens* Hall, Proc. Amer. Assoc. Adv. Sci., 33, 1884, p. 420.—Hall and Clarke, Pal. New York, 7, 1888, p. 157, pl. 27, figs. 3, 4.

*Eurypterus?* (*Dolichopterus?*) *prominens* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 200, fig. 38.

Clinton sandstone: Northern part of Cayuga County, New York.

**Eurypterus pustulosus** Hall.

*Eurypterus pustulosus* Hall, Pal. New York, 3, 1859, p. 413, pl. 83B, fig. 1.—Grabau, Bull. New York State Mus., 45, 1901, p. 229; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 201, pls. 23, 24, figs. 39–41.

*Eurypterus giganteus* Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1883, p. 41, pl. 2, fig. 1.

*Pterygotus globicaudatus* Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1883, p. 42, pl. 2, fig. 2.—Laurie, Trans. Royal Soc. Edinburgh, 37, 1893, p. 515.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 231; Bull. New York State Mus., 45, 1901, p. 231.

Cayugan (Bertie): Buffalo, New York.

*Plesiotype*.—Cat. No. 60051, U.S.N.M.

**Eurypterus ranilarva** Clarke and Ruedemann.

*Eurypterus ranilarva* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 208, pl. 17, fig. 7; pl. 18, figs. 1, 2.

Cayugan (Kokomo): Kokomo, Indiana.

**Eurypterus remipes** Dekay.

*Eurypterus remipes* Dekay, Annals Lyceum Nat. Hist. New York, 1, 1825, p. 375, pl. 29; *ibid.*, 2, 1828, p. 273.—Harlan, Trans. Geol. Soc. Pennsylvania, 1, 1832, p. 96, pl. 5, fig. 1; Amer. Mo. Mag., 3, 1834, p. 291; Medical, Physical Res., 1835, p. 297, fig. 1.—Bronn, Leth. Geol., 1, 1835–1837, p. 109, fig. 1.—Hibbert, Trans. Roy. Soc. Edinburgh, 13, 1836, pl. 12, fig. 7, p. 281.—Edwards, Hist. Nat. d. Crustaces, 3, 1840, p. 422.—Fischer de Waldheim, Bull. Soc. Geol. France, 11, 1840, p. 368.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, pp. 99, 100, fig.—Roemer, Palaeontographica, 1, 1848, p. 190, pl. 27.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 529, pl. 46, fig. 14.—Hall, Pal. New York, 3, 1859, p. 382; p. 403, figs. 6, 7; p. 404, pl. 80, figs. 1–12; pl. 80A, figs. 1–6; 11–17; pl. 83B, fig. 2; pl. 84A, figs. 1, 2.—Emmons, Man. Geol., 1860, p. 41, fig. 34; p. 122, fig. 4.—Chapman, Canadian Jour., n. s., 8, 1863, p. 440, fig. 227; Expos. Min. Geol. Canada, 1864, p. 191, fig. 227.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, pp. 958, 959, figs. 463a, b, 464.—Woodward, Quart. Jour. Geol. Soc. London, 23, 1867, pl. 1, fig. 7.—Meek and Worthen, Amer. Jour. Sci. Arts, 2d ser., 46, 1868, footnote p. 20, p. 546.—Woodward, Mon. British Foss. Crust., Palaeontographical Soc., 1872, p. 132, fig. 40.—Walcott, Bull. Mus. Comp. Zool., 8, 1881, pl. 5, fig. 7.—Peach, Proc. Royal Soc. Edinburgh, 9, 1888, pl. 20, figs. 2, 2a.—Miller, N. A. Geol. Pal., 1889, p. 548, fig. 1008.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 236, fig.—Clarke, Zittel-Eastman Textb. Pal., 1900, 1, pt. 2, p. 676, figs. 1420, 1421.—Grabau, Bull. New York State Mus., 45, 1901, p. 229, pl. 18; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229, pl. 18.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 408, fig. 1709, Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 161, pls. 2–8, figs. 33, 34.

Cayugan: Waterville, Litchfield, Seneca Falls, North Buffalo, etc. (Bertie), and Seneca Falls (Rondout), New York.

**EURYPTERUS REMIPES** Bronn and Roemer. See *Eurypterus lacustris*.

**EURYPTERUS ROBUSTUS** Grabau. See *Eurypterus lacustris*.

**Eurypterus? (Dolichopterus?) stellatus** Clarke and Ruedemann.

*Eurypterus? (Dolichopterus?) stellatus* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 211, pl. 83, figs. 1–4.

Trenton (Schenectady): Schenectady, New York.



**EURYSOMA** Claypole. See *Eusarcus* Grote and Pitt.

**EURYSTOMITES** Schröder.

Genotype: *Nautilus kelloggi* Whitfield.

*Eurystomites* Schröder, Pal. Abhandl. von Dames u. Kayser, Neue Folge, 1, Heft 4, Jena, 1891, p. 26.—Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 441.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 773.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 811.—Ruedemann, Bull. New York State Mus., 90, Pal., 14, 1906, pp. 451, 456.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 68.

***Eurystomites accelerans*** Ruedemann.

*Eurystomites accelerans* Ruedemann, Bull. New York State Mus., 90, 1906, p. 460, pl. 18, figs. 2, 3; fig. 23.

Canadian (Beekmantown): Valcour, New York.

***Eurystomites amplexens*** Ruedemann.

*Eurystomites amplexens* Ruedemann, Bull. New York State Mus., 90, 1906, p. 461, pl. 18, figs. 4-7; fig. 24.

Canadian (Beekmantown): Valcour, New York.

***Eurystomites apollo*** (Billings).

*Lituites Apollo* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 25 (adv. sheets 1862).

*Eurystomites apollo* Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.).

Canadian (Romaine): Mingan Islands, Canada.

**EURYSTOMITES CHAMPLAINENSIS** Schröder. See *Tarphyceras champlainense*.

***Eurystomites gibbosus*** Hyatt.

*Eurystomites gibbosus* Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 443.

Canadian (Quebec): Port aux Choix, Schooner Island, Newfoundland.

***Eurystomites imperator*** (Billings).

*Lituites imperator* Billings, Geol. Vermont, 2, for 1861, 1862, p. 957; Rep. Econ. Geol., etc., Vermont, 1862, p. 229; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 23 (adv. sheets 1861).

*Eurystomites imperator* Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.).

Canadian (Beekmantown): Phillipsburg, Quebec.

***Eurystomites kelloggi*** (Whitfield).

*Nautilus kelloggi* Whitfield (part), Bull. Amer. Mus. Nat. Hist., 1, 1886, 8, p. 328, pl. 30, fig. 1 (not pl. 31, figs. 4, 5—*E. rotundus* Hyatt).

*Eurystomites kelloggi* Schröder, Pal. Abh. herausg. von Dames und Kayser, 5, Heft 4, 1891, p. 27.—Hyatt, Amer. Phil. Soc. Proc., 32, 1894, p. 442, pl. 5, figs. 4, 5; figs. 21, 22.—Ruedemann, Bull. New York State Mus., 90, 1906, pp. 451, 456, figs. 21, 22; pl. 17, fig. 1; pl. 18, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 69, fig. 1278.

Canadian: Fort Cassin, Vermont; Valcour, New York (Beekmantown); Picketts Station, Wisconsin (Shakopee).

*Plesiotype*.—Cat. No. 25647, U.S.N.M.

***Eurystomites plicatus*** Whiteaves.

*Eurystomites plicatus* Whiteaves, Canadian Rec. Sci., 6, 1895, p. 396; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 225, figs. 15, 16; pl. 22, fig. 2.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 173.

Black River or Richmond: Little Black Island, Lake Winnipeg, and Baffin Land, Canada.

**Eurystomites robertsoni** (Hall).

*Lituites robertsoni* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 38.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 64, pl. 10, figs. 4-6.

*Eurystomites robertsoni* Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.). Black River (Platteville): Beloit, Wisconsin; Rockford, Illinois.

**Eurystomites rotundus** Hyatt.

*Nautilus kelloggi* Whitfield (part), Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 328, pl. 31, figs. 4, 5.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 53, figs. 4, 5.

*Eurystomites rotundus* Hyatt, Amer. Phil. Soc. Proc., 32, 1894, p. 443, pl. 5, figs. 21-25.—Ruedemann, Bull. New York State Mus., 90 1906, p. 463.

Canadian (Beekmantown): Fort Cassin, Vermont.

*Cotypes*.—Cat. No. 25655, U.S.N.M.

**EURYSTOMITES UNDATUS** Hyatt. See *Plectoceras? undatum*.

**EURYSTOMITES UNDATUS** var. **OCCIDENTALIS** Clarke. See *Plectoceras undatum occidentale*.

**Eurystomites virginianus** Hyatt.

*Eurystomites virginiana* Hyatt, Amer. Phil. Soc. Proc., 32, 1894, p. 444.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 463.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 69.

Canadian (Beekmantown): Near Lexington, Virginia; Fort Cassin, Vermont.

*Holotype*.—Cat. No. 9611, U.S.N.M.

**EUSARCUS** Grote and Pitt.

Genotype: *E. scorpionis* Grote and Pitt.

*Eusarcus* Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1875, pp. 1, 2.—Pohlman, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 29.—Claypole, Amer. Geol., 13, 1894, p. 78, footnote.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 676; *ibid.*, 2d ed., 1913, p. 783.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230; Bull. New York State Mus., 45, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 409.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 226.

*Eurysoma* Claypole, Amer. Geol., 6, p. 258. (Genotype, *E. newlini* Claypole.)

*Carcinosoma* (*Eurysoma* preoccupied) Claypole, Amer. Geol., 13, 1894, p. 78.—Miller, N. A. Geol. Pal., 1st App. 1892, p. 706.

**Eusarcus(?) cicerops** (Clarke).

*Eurypterus? cicerops* Clarke, Bull. New York State Mus., 107, 1907, p. 307, pl. 5, fig. 10; pl. 5, fig. 7.

*Eusarcus(?) cicerops* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 253, pl. 36, figs. 2-10.

Medinan (Shawangunk): Otisville, New York.

**EUSARCUS GRANDIS** Grote and Pitt. See *Eusarcus scorpionis*.

**Eusarcus lingulatus** Clarke and Ruedemann.

*Eusarcus lingulatus* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 413, figs. 96, 97.

Chazyan (Normanskill): Catskill, New York.

**Eusarcus longiceps** Clarke and Ruedemann.

*Eusarcus longiceps* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 257, pl. 84, figs. 1-6.

Trenton (Schenectady): Schenectady, New York.



**Eusarcus newlini** (Claypole).

*Eurysoma newlini* Claypole, Amer. Geol., 6, 1890, pp. 258, 260, fig. 3.

*Carcinosoma newlini* Claypole, Amer. Geol., 6, 1890, p. 400; *ibid.*, 13, 1894, p. 78.

*Eusarcus newlini* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 245, pl. 36, fig. 11; pls. 37-39, figs. 59, 60.

*Carcinosoma ingens* Claypole, Amer. Geol., 13, 1894, p. 77, pl. 4.

Cayugan (Kokomo): Kokomo, Indiana.

*Plesiotype*.—Cat. No. 42559, U.S.N.M.

**Eusarcus scorpionis** Grote and Pitt.

*Eusarcus scorpionis* Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1875, p. 1.—

Pohlman, *ibid.*, 4, 1881, p. 21.—Grabau, Bull. New York State Mus., 45, 1901, p. 231; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 231.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 410.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 233, pls. 27-34; pl. 35, figs. 2-5; pl. 36, fig. 1; figs. 54-58.

*Eusarcus grandis* Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1875, p. 17.—Pohlman, *ibid.*, 5, 1886, p. 31.—Grabau, Bull. New York State Mus., 45, 1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 410.

Cayugan (Bertie): Williamsville and Buffalo, New York.

**EUSARCUS SCORPIONIS** Pohlman. See *Dolichopterus siluriceps*.

**Eusarcus triangulatus** Clarke and Ruedemann.

*Eusarcus triangulatus* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 258, pl. 84, figs. 7-9.

Trenton (Schenectady): Schenectady, Duaneburg, and Rotterdam Junction, New York.

**Eusarcus vaningeni** Clarke and Ruedemann.

*Eusarcus vaningeni* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 420, figs. 108-115.

Cuyagan (Pittsford): Oriskany Creek, near Clinton, New York.

**EUSPIROCRINUS** Angelin.

Genotype: *E. spiralis* Angelin.

*Euspirocrinus* Angelin, Icon. Crin. Suec., 24, 1878.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 366 (Rev. Pal., pt. 1, p. 143); *ibid.*, 1886, pp. 112, 143 (Rev. Pal., pt. 3, sec. 2, pp. 188, 219).—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 173.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 157.—Springer, *ibid.*, 2d ed., 1913, p. 218.—Zittel, Grundzuge Pal., 1, 1910, pp. 135, 154.

**Euspirocrinus obconicus** W. R. Billings.

*Euspirocrinus obconicus* W. R. Billings, Trans. Ottawa Field Nat. Club, 2, 1885, p. 248, pl. fig.—Miller, N. A. Geol. Pal., 1889, p. 246, figs. 306, 307.

Trenton: Ottawa, Ontario; Hull, Quebec.

**EUTHYRIS** Quenstedt. See *Athyris* McCoy.

**FABERIA** Miller.

Genotype: *F. anomala* Miller.

*Faberia* Miller, N. A. Geol. Pal., 1889, p. 549.

**Faberia anomala** Miller.

*Faberia anomala* Miller, N. A. Geol. Pal., 1889, p. 549, fig. 1009.

Maysville or Richmond: Butler County, Ohio.

**FAVASTRÆA STRIATA** D'Orbigny. See *Strombodes striatus*.

**FAVISTELLA** Dana. See *Columnaria* Goldfuss.

**FAVISTELLA FAVOSIDEA** Hall. See *Favosites favosidea*.

**Favistella? franklini** Salter.

*Favistella Franklini* Salter, Sutherland's Jour. Voyage in Baffins Bay, etc., 2, 1852, p. 229, pl. 6, figs. 3, 3a.—Haughton, Jour. Geol. Soc. Dublin, 1, 1859, p. 247, pl. 11, fig. 1.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 586. Silurian: Cape Riley, Dobbin Bay, and Cape Hilgard, Arctic America.

**Favistella? reticulata** Salter.

*Favistella reticulata* Salter, Sutherland's Jour. Voyage in Baffins Bay, etc., 2, App., 1852, p. 229, pl. 6, figs. 2, 2a.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 586. Silurian: Cape Riley, Franklin Pierce Bay, and Cape Hilgard, Arctic America.

**FAVOSITELLA** Etheridge and Foord.

Genotype: *Favosites interpuncta* Quenstedt.

*Bythotrypa* Ulrich, Geol. Minnesota, 3, 1893, p. 324; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123. (Genotype: *Fistulipora? laxata* Ulrich.)

*Favositella* Etheridge and Foord, Ann. Mag. Nat. Hist., 5th ser., 13, 1884, p. 472.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 100–102; Zittel-Eastman Textb. Pal., 1913, p. 328.

**Favositella epidermata** (Ulrich).

*Crepipora epidermata* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 471, pl. 40, figs. 1–1e.

*Bythotrypa epidermata* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 186 (gen. ref.).

Richmond (Fernvale): Wilmington and Savannah, Illinois; Tennessee.

*Cotypes*.—Cat. No. 43229, U.S.N.M.

**Favositella laxata** (Ulrich).

*Fistulipora? laxata* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 37, pl. 8, figs. 2, 2a.

*Bythotrypa laxata* Ulrich, Geol. Minnesota, 3, 1893, p. 325, pl. 28, figs. 21–25; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 440 (p. 268).—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 163.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 124, fig. 182c.

*Favositella laxata* Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 101 (gen. ref.); Zittel-Eastman Textb. Pal., 1913, p. 329, fig. 467.

Black River and Trenton: St. Andrews, Manitoba; Minneapolis, St. Paul, Kenyon, Berne, and Cannon Falls, Minnesota; Rockton, Illinois; Decorah, Iowa.

Fragment of *holotype* and *plesiotypes*.—Cat. Nos. 43220, 43241, U.S.N.M.

**FAVOSITES** Lamarck.

Genotype: *F. alveolatus* Lamarck.

*Favosites* Lamarck, Cours. de Zool. du Mus. Hist. Nat., Hist. An. Sans Vert., 1812, p. 204.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 193.—Koninck, Desc. Animaux Fossiles, Leige, p. 9.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 191.—Dana, Wilkes U. S. Expl. Exped., 7, Zoophytes, 1838, p. 430.—Edwards and Haime, Compt. Rend. de l'Acad. Sci., 29, 1849, p. 260; Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 152, 230.—Hall, Pal. New York, 2, 1852, p. 124.—McCoy, British Pal. Rocks, Fossils, 1854, p. 19.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 440.—Billings, Canadian Jour., n. s., 4, 1859, p. 99.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 246.—Verrill, Amer. Jour. Sci., 3d ser., 3, 1872, p. 191; Ann. Mag. Nat. Hist., 4th ser., 9, 1872, p. 360.—Duncan, Rep. 41st Meeting



**FAVOSITES**—Continued.

- British Assoc. Adv. Sci., 1872, p. 132.—Koninck, Animaux Foss. Terr. Carb. Belgique, 1872 (Mem. l'Acad. Royale Sci. Belgique), 39, p. 136.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 38.—Salter, Cat. Camb. Sil. Foss., 1873, p. 104.—Nicholson, Geol. Mag., 10, 1873, p. 567; Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 44.—Moseley, Proc. Royal Soc. London, 25, 1875, p. 66.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 183.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 19.—Zittel, Handb. Pal., 1, 1879, p. 236.—Nicholson, Tab. Corals Pal. Period, 1879, p. 37.—Thomson, Proc. Phil. Soc. Glasgow, 13, 1881, pp. 201, 202, fig. 1A.; Proc. Phil. Soc. Glasgow, 14, 1883, p. 349; *ibid.*, 20, 1889, p. 121, fig.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 419.—Frech, Zeits. d. Deutschen geol. Gesell., 37, 1885, p. 100.—Hall and Simpson, Pal. New York, 6, 1887, p. 13.—Nicholson, Geol. Mag., dec. 3, 5, 1888, p. 107.—Miller, N. A. Geol. Pal., 1889, p. 188.—Beecher, Trans. Connecticut Acad. Arts Sci., 8, 1891, pp. 209, 210, 215.—Girty, Amer. Geol., 15, 1895, pp. 131-146.—Sardeson, Neues Jahrb. f. Min., Geol., Pal., Beilage-Bd., 10, 1896, pp. 251, 284.—Girty, Amer. Geol., 18, 1896, p. 41.—Say (reprint), Bull. Amer. Pal., 1, 1896, p. 278.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 2.—Lindstrom, Kongl. Sven. Vet. Akad. Handl., 32, 1899, p. 49.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 130; Zittel-Eastman Textb. Pal., 1, 1900, p. 99; Bull. New York State Mus., 9, 1901, p. 140; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 140.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 213.—Beecher, Amer. Jour. Sci., 16, 1903, p. 9.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 84; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 113.
- Calamopora Goldfuss, Petrefacta, 1826, pp. 77, 245; 2d ed., pt. 1, 1862, p. 72.
- Emmonsia Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 152-246.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 441.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 257.—Rominger, Jour. Sci. Arts, 2d ser., 34, 1862, p. 391.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 38.—Zittel, Handb. Pal., 1, 1879, p. 237.—Nicholson, Tab. Corals Pal. Period, 1879, p. 41.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 422.—Miller, N. A. Geol. Pal., 1889, p. 187.
- Astrocerium Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, pp. 399-400; Pal. New York, 2, 1852, p. 120.—Rominger, Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 391.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 39; Tab. Corals Pal. Period, 1879, p. 40.

**FAVOSITES ALVEOLARIS** Lonsdale. See *Paleofavosites asper*.

**FAVOSITES ASPERA** D'Orbigny. See *Paleofavosites aspera*.

**Favosites basalticus nanus** Grabau.

*Favosites basaltica* Goldfuss var. *nana* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 110, pl. 10, figs. 5, 6.

Upper Monroan (Anderdon): Salt shaft, Detroit, Michigan.

**FAVOSITES? CAPAX** Billings. See *Paleofavosites asper*.

**Favosites concavus** Grabau.

*Favosites concava* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 114, pl. 15, figs. 2, 3.

Upper Monroan (Anderdon): Amherstburg, Ontario.

**Favosites constrictus** (Hall).

*Astrocerium constrictum* Hall, Pal. New York, 2, 1852, p. 123, pl. 34A, figs. 2a-c, 3a-e.

**Favosites constrictus**—Continued.

- Favosites constrictus* Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 142, fig. 37;  
Bull. New York State Mus., 45, 1901, p. 142, fig. 37.  
Clinton (Rochester): Lockport, etc., New York; Ontario.

**Favosites corrugatus** Weller.

- Favosites corrugatus* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 220, pl. 17,  
figs. 1, 2.  
Helderbergian (Decker Ferry): Flatbrookville, New Jersey.

**Favosites cristatus** Edwards and Haime.

- Favosites cristatus* Edwards and Haime, Pal. Foss. Terr. Paleozoic, 1851, p. 242.—  
Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 9,  
figs. 1-5.  
Silurian: Gotland, England, etc.; Indiana, Kentucky, and Tennessee (Osgood  
and Louisville-Brownsport).

**Favosites cristatus major** Davis.

- Favosites cristatus* var. *major* Davis, Kentucky Fossil Corals, Geol. Surv. Ken-  
tucky, pt. 2, 1885, pl. 24, fig. 3.  
Niagaran: Louisville, Kentucky (Louisville); Perry and Decatur Counties, Ten-  
nessee (Brownsport).

**Favosites declinatus** Foerste.

- Favosites declinata* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 300, pl. 2,  
figs. 4a, b, and pl. 4, fig. 4.  
Clinton (Waco): Near Irvine, Panola, Waco, etc., Kentucky.

**Favosites discoideus** (Roemer).

- Calamopora forbesi* var. *discoidea* Roemer, Sil. Fauna West. Tennessee, Breslau,  
1860, p. 19, pl. 2, fig. 10a, b; Leth. geog., pt. 1, Leth. Pal., 1883, p. 454.  
*Favosites forbesi* var. *discoidea* Miller, N. A. Geol. Pal., 1889, p. 188 (gen. ref.).  
*Favosites discoidea* Foerste, Jour. Geol., 11, 1903, p. 713.  
Niagaran (Brownsport): Perry, Wayne, and Decatur Counties, Tennessee.

**Favosites discus** Davis.

- Favosites discus* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2,  
1885, pl. 9, figs. 8, 9.  
Niagaran: Louisville, Kentucky (Louisville); West Tennessee (Brownsport).

**FAVOSITES EXCRETUS** Hall. See *Favosites spinigerus*.**Favosites favosideus** (Hall).

- Favistella favosidea* Hall, Pal. New York, 2, 1852, p. 41, pl. 17, figs. 2a-f.  
*Favosites favosideus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 333.  
Clinton: Rochester, Soda, etc., New York.  
Upper Medinan (Brassfield): Dayton, Ohio.

**Favosites favosus** (Goldfuss).

- Calamopora favosa* Goldfuss, Petrefacta, 1826, p. 77, pl. 26, fig. 2a-c; *ibid.*, 2d ed.,  
pt. 1, 1862, p. 73.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 70.—Roemer,  
Sil. Fauna West. Tennessee, Breslau, 1860, p. 18, pl. 2, fig. 8.—Rominger,  
Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 392.  
*Favosites favosa* Edwards and Haime Mon. d. Polyp. Foss. d. Terr. Pal. 1851  
(Arch. du Mus. d'Hist. Nat., 5), p. 233.—Hall, Pal. New York, 2, 1852, p. 126,  
pl. 34a (bis), fig. 5a-g.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 248.—



**Favosites favosus**—Continued.

Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 32 (loc. ref.).—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 147; Geol. Surv. Ohio, Pal. 2, 1875, p. 229; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 52.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 21, pl. 4, figs. 1-4; pl. 5, fig. 2.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 383, pl. 52, figs. 1, 2.—Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 253, pl. 3, figs. 1-4.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 8, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 239, figs.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 333.—Keyes, Missouri Geol. Surv., 4, 1894, p. 120, pl. 14, fig. 2.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, illus. sheet, 1903, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 84, fig. 137.

*Favosites gothlandicus* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 298, pl. 2, figs. 1a, b.

Silurian (Brassfield-Guelph): Drummonds Island, Lake Huron; Anticosti; Ontario; Michigan; Missouri; Iowa; Ohio; Kentucky; etc.

*Plesiotypes*.—Cat. No. 52654, U.S.N.M. (Davis).

**Favosites favosus integritabulatus** Swartz.

*Favosites favosus* var. *integritabulatus* Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 214, pl. 24, figs. 1, 2.

Helderbergian (Keyser): Warrior Mountain, east of Flintstone, Maryland.

**Favosites forbesi** Edwards and Haime.

*Favosites forbesi* Edwards and Haime, British Foss. Corals, 1854, p. 258.—Lindstrom, Ofvers K. Vet. Akad. Forhandl., 30, 4, 1873, p. 22.—Nicholson, Geol. Mag., 10, 1873, p. 569; Canadian Jour., n. s., 14, 1873, p. 40, 45; Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 48, pl. 7, fig. 8; pl. 8, fig. 4; Trans. Royal Soc. Edinburgh, 27, 1876, p. 247; Tab. Corals Pal. Period, p. 56, pl. 1, fig. 7; pl. 2, figs. 1-3; pl. 3, figs. 1, 2.—Roemer, Leth. Geol., pt. 1, Leth. Pal., 1883, p. 421, pl. 9, fig. 5a-c.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 8, figs. 5, 6.—Weissermel, Zeits. d. d. geol. Gesell., 46, 1894, p. 648, pl. 52, fig. 1.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 50.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 339, fig. 16, pl. 87, 100.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 31.

Silurian: Europe; Rochester, etc., New York; Ontario; Kentucky; Tennessee (Niagaran); Anticosti.

*Plesiotype*.—Cat. No. 52658, U.S.N.M. (Davis).

**FAVOSITES FORBESI** var. **DISCOIDEA** Roemer. See *Favosites discoideus*.

**FAVOSITES FORBESI** var. **EIFELENSIS** Hortedahl. See *Favosites pyriformis*.

**Favosites forbesi occidentalis** Hall.

*Favosites Forbesi* var. *occidentalis* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 4, figs. 6-15; *ibid.*, mus. ed., 1879, p. 109, pl. 4, figs. 6-15; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 229, pl. 1, figs. 11-14; pl. 3, figs. 6-15.—Miller, N. A. Geol. Pal., 1889, p. 188, fig. 175.—Girty, Amer. Geol., 15, 1895, pp. 134-136, pl. 7, figs. 1-26; pl. 8, figs. 20-25, figs. 1-5.—Weissermel, Zeits. Geol. Gesell., 49, 1897, p. 377, fig. 2.

*Favosites Forbesi* var. *Waldronensis* Nicholson, Tab. Corals Pal. Period, 1879, p. 60, pl. 2, figs. 2-2b.

Niagaran (Waldron): Waldron, Indiana; Newsom, etc., Tennessee.

**FAVOSITES FORBESI** var. **WALDRONENSIS** Nicholson. See *Favosites forbesi occidentalis*.

**Favosites gaspensis** Lambe.

*Favosites Gaspensis* Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 8.

Silurian(?): L'Anse au Gascon, Baie des Chaleurs, Quebec

**Favosites goldfussi** (Castelnau).

Not recognized.

*Calamopora goldfussi* Castelnau, Syst. Sil., 1843, p. 47.

?*Favosites goldfussi* Miller, N. A. Geol. Pal., 1889, p. 188, fig. 176.

Silurian: Manitoulin Islands, Lake Huron, and Sturgeon Bay, Wisconsin.

**FAVOSITES GOTHLANDICA** Foerste. See *Favosites favosus*.

**Favosites gothlandicus** (Fought).

*Corallium gothlandicum* Fought, Amoen. Acad., 1, 1749, p. 106, pl. 4, fig. 27.

*Calamopora gothlandica* Goldfuss, Petrefacta, 1826, p. 78, pl. 26, figs. 3a-e; *ibid.*, 2d ed., 1862, p. 73.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 69.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, pl. 16, fig. 3.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 18, pl. 2, figs. 9, 9a, 9b.

*Favosites gothlandica* Lam., Syst., 2, 1816, p. 206.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 232.—Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., 1852, p. 228.—Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 256, pl. 60, figs. 1, 1a.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 305, fig. 302; Proc. Portland Soc. Nat. Hist., 1, 1863, p. 106.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 83.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 32.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 50.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 3, pl. 1, fig. 1.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 30.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 244.—Lambe, Cruise of the "Neptune," App. 4, 1906, p. 325.

Silurian: Europe and (?) America.

Observation.—Typical *F. gothlandicus* is probably not represented in American strata. The above references to American Silurian forms have not been accurately determined. *F. favosus* and *F. niagarensis* are the principal American species usually identified as *F. gothlandicus*.

**FAVOSITES HALLIANA** Nicholson. See *Cladopora multipora*.

**Favosites helderbergiae præcedens** Schuchert.

*Favosites niagarensis*? Hall, Pal. New York, 2, 1852, p. 324, pl. 73, figs. 1a-1e.

*Favosites helderbergiae præcedens* Schuchert, Am. Geol., 31, 1903, p. 164.—Grabau, Bull. New York State Mus., 92, 1906, p. 108, fig. 7.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 209, pl. 22, figs. 2-7.

Helderbergian: Schoharie, Litchfield, etc., New York (Coeymans); Cash Valley, Pinto, etc., Maryland; West Virginia; Pennsylvania (Keyser).

*Cotypes*.—Cat. No. 10533, U.S.N.M.

**Favosites hisingeri** Edwards and Haime.

*Favosites hisingeri* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 240, pl. 17, figs. 2-2b; Mon. British Foss. Corals, Pal. Soc., 1854, p. 259, pl. 61, figs. 1a, 1b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 51.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 6.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 29.



**Favosites hisingeri**—Continued.

- Astrocerium parasiticum* Hall, Pal. New York, 2, 1852, p. 122, pl. 34, fig. 2a-i.  
*Favosites parasiticum* Grabau, Bull. New York State Mus., 45, 1901, p. 141, fig. 35;  
 Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 141, fig. 35.  
*Astrocerium venustum* Hall, Pal. New York, 2, 1852, p. 120, fig.; p. 121, pl. 34,  
 figs. 1a-j; Rep. Geol. Surv. Wisconsin, 1862, p. 66, fig. 1.—Whitfield, Geol.  
 Wisconsin, 4, 1882, p. 270, pl. 13, figs. 8-10.—Chamberlin, Geol. Wisconsin, 1,  
 1883, p. 188, fig.  
*Calamopora venusta* Rominger, Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 394.  
*Favosites venustus* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p.  
 83.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 390.—Nichol-  
 son and Hinde, Canadian Jour., n. s., 14, 1874, p. 147.—Nicholson, Geol.  
 Surv. Ohio, Pal., 2, 1875, p. 226; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 52.—  
 Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 23, pl. 5, fig. 3.—Hall, 12th  
 Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 253, pl. 2, figs. 7, 8.—  
 Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 9, figs.  
 7, 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 243, figs.—  
 Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 335.—Grabau, Bull. Buffalo  
 Soc. Nat. Sci., 7, 1901, p. 140, fig. 34; Bull. New York State Mus., 45, 1901, p.  
 140, fig. 34.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 84, fig.  
 136a, b.  
 Silurian: England, etc. Various localities in the Cataract and Niagaran of the  
 United States and Canada.

**Favosites hisingeri aplata** Foerste.

- Favosites hisingeri-aplata* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 299,  
 pl. 2, fig. 2; pl. 4, fig. 5.  
 Clinton (Waco): Near Estill Springs, north of Irvine, etc., Kentucky.

**Favosites hispidus** Rominger.

- Favosites hispidus* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 23, pl. 5,  
 fig. 4.  
 Niagaran: Drummond's Island, Lake Huron; Point Detour, Michigan.  
 Observation.—Probably the same as *F. hisingeri*.

**Favosites louisvillensis** Davis.

- Favosites louisvillensis* Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt.  
 2, 1885, pl. 9, fig. 6.  
 Niagaran (Louisville): Near Louisville, Kentucky.

**Favosites louisvillensis** Greene.

- Favosites louisvillensis* Greene, Cont. Indiana Pal., 1, pt. 19, 1904, p. 186, pl. 56,  
 fig. 2.  
 Niagaran (Louisville): Near Louisville, Kentucky.  
 Observation.—On account of the synonymy that undoubtedly exists among the  
 Louisville corals, it is useless to propose a new name for this preoccupied term.  
 Moreover it is possible that both names refer to the same species.

**FAVOSITES LYCOPERDON** Owen. See *Chætetes lycoperdon*.**Favosites lycopodites** Vanuxem.

Not recognizable.

- Favosites lycopodites* Vanuxem, Geol. Rep. 3d District New York, 1842, p. 46,  
 fig. 3.—Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 389, fig. 3; p. 395.—  
 Mather, Nat. Hist. New York, Geol., 1, 1843, p. 397, fig. 3.—Lesley, Geol.  
 Surv. Pennsylvania, Rep. P 4, 1889, p. 242, fig.  
 Trenton: New York, etc.

**Favosites maximus** (Troost).

Not recognized.

Calamopora maximus Troost, 5th Rep. Geol. Tennessee, 1840, p. 73.

Favosites maxima Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 76, fig. 7, pl. 13.—Yandell and Shumard, Contr. Geol. Kentucky, 1847, p. 7.

Favosites cf. maximus Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 115, pl. 15, figs. 4, 5.

"Mountain limestone": Near Nashville, Tennessee.

Observation.—Troost's description probably refers to a large-celled variety of Columnaria alveolata, abundant in the Richmond group north of Nashville. Owen's figures are of a true Favosites, probably F. favosus. Grabau's reference is also to a true Favosites.

FAVOSITES MULTIPORA Nicholson. See Cladopora multipora.

**Favosites niagarensis** Hall.

Favosites niagarensis Hall, Pal. New York, 2, 1852, p. 125, pl. 34a (bis), fig. 4a-i.—Billings, Canadian Nat. Geol., 1, 1856, p. 60, pl. fig. 1; *ibid.*, 4, 1859, p. 103.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 40.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1895, pl. 8, figs. 3, 4.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 334; Geol. Surv. Ohio, Pal., 7, 1893, p. 601.—Lambe, Cont. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 7.—Grabau, Bull. New York State Mus., 45, 1901, pp. 142, 143, fig. 38; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 142, fig. 38.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 28; Bull. New York State Mus., 65, 1903, p. 48.—Shimer, Bull. New York State Mus., 80, 1905, p. 236.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 85.

Niagaran: Niagara Falls, Lockport, etc., New York (Rochester); Ontario; Michigan; Iowa; Kentucky; Tennessee; etc.

FAVOSITES NIAGARENSIS? Hall (part). See Favosites helderbergiae præcedens.

FAVOSITES NIAGARENSIS Rominger. See Paleofavosites asper.

FAVOSITES NIAGARENSIS var. SPINIGERA Hall. See Favosites spinigerus.

**Favosites obliquus** Rominger.

Favosites obliquus Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 24, pl. 28, fig. 2.

Niagaran: Point Detour, Michigan; Drummonds Island, Lake Huron; Masonville, Iowa.

**Favosites obpyriformis** Foerste.

Favosites obpyriformis Foerste, Jour. Geol., 11, 1903, p. 713; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 100, pl. 4, fig. 74.

Niagaran (Brownsport): Near Vice, Decatur County, Tennessee.

**Favosites occidentis** Whitfield.

Favosites occidentis Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 78; Geol. Wisconsin, 4, 1882, p. 313, pl. 23, figs. 6, 7.

Niagaran (Guelph): Ozaukee, etc., Wisconsin.

FAVOSITES PARASITICUS Hall. See Favosites hisingeri.

FAVOSITES PROLIFICUS Billings. See Paleofavosites asper.

**Favosites pyriformis** (Hall).

Asterocerium pyriforme Hall, Pal. New York, 2, 1852, p. 123, pl. 34A, fig. 1a-e.



**Favosites pyriformis**—Continued.

*Favosites pyriformis* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 25.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 141, fig. 36; Bull. New York State Mus., 45, 1901, p. 141, fig. 36.—Weller, Geol. Surv. New Jersey, 3, 1903, p. 220, pl. 17, figs. 3-5.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 211, pl. 23, figs. 1-4.

*Favosites forbesi eifelensis* Hortedahl, 2d Arct. Exp. Fram, 1898-1902, No. 32, 1914, p. 11, pl. 4, figs. 5, 6.

Clinton (Rochester) and Niagaran (Lockport): Lockport, etc., New York.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Cookerly, etc., Maryland (Keyser); southwestern Ellesmereland, Arctic America.

Observation.—The Helderbergian specimens described by Weller, Swartz, and Hortedahl probably belong to a distinct species or variety as noted by the last author.

**Favosites pyriformis kokomoensis** Foerste.

*Favosites pyriforme-kokomoensis* Foerste, Cincinnati Soc. Nat. Hist., Jour., 21, 1909, p. 9, pl. 1, figs. 17a-d, pl. 2, fig. 15.

Cayugan (Kokomo): Kokomo, Indiana.

**Favosites rectangularis** Grabau.

*Favosites rectangularis* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 111, pl. 14, figs. 3, 4.

Upper Monroan (Anderdon): Salt shaft, Detroit, Michigan; Amherstburg, Ontario.

**FAVOSITES SERIATA** Nicholson. See *Cladopora seriata*.

**Favosites spinigerus** Hall.

*Favosites Niagarensis?* var. *spinigera* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 4, fig. 1-5.

*Favosites spinigerus* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 108, pl. 4, figs. 1-5; 11th Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 228, pl. 3, figs. 1-5; pl. 8, figs. 1, 2.—Girty, Amer. Geol., 15, 1895, p. 136, pl. 8, figs. 6-15.

*Favosites excretus* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 9, figs. 1, 2.

*Favosites spongilla* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 25.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 8, figs. 7-9.

Niagaran (Waldron-Brownsport): Waldron, St. Paul, etc., Indiana; Newsom, etc., Tennessee; Louisville, Kentucky.

*Plesiotype*.—Cat. No. 52645, U.S.N.M.

**FAVOSITES SPONGILLA** Rominger. See *Favosites spinigera*.

**Favosites striatus** Say.

Not recognized.

*Favosites striatus* Say, Amer. Jour. Sci., 1, 1818, p. 384.

Silurian: Falls of the Ohio, etc.

**Favosites subelongus** Savage.

*Favosites subelongus* Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 64, pl. 3, figs. 9, 10.

Upper Medinan (Edgewood): Near Edgewood, Louisiana, and south of Clarksville, Pike County, Missouri.

**Favosites troosti** Edwards and Haime.

*Favosites troosti* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 238, pl. 18, figs. 1, 1a.—Billings, Canadian Jour., n. s., 4, 1859, p. 103.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 40.

**Favosites troostii**—Continued.

Silurian: Iowa.

Observation.—Although recorded from the Silurian of Iowa, this species is undoubtedly a Devonian form like *F. hemisphericus*.

**Favosites tuberosoides** Grabau.

*Favosites tuberosoides* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 112, pl. 14, fig. 2.

Upper Monroan (Amherstburg): Detroit River, opposite Amherstburg, Ontario.

**FAVOSITES VENUSTUS** Hall. See *Favosites hisingeri*.

**FENESTELLA** Lonsdale. (Not *Fenestella* Bolten 1798.) Genotype: *Gorgonia antiqua* Goldfuss. Accepted genotype: *Fenestella plebeia* McCoy.

*Fenestella* Lonsdale, Murchison's Sil. Syst., 1839, p. 677.—Phillips, Pal. Foss., 1841, p. 22.—McCoy, Synopsis Carb. Foss. Ireland, 1844, p. 200.—Lonsdale, Russia and the Ural Mountains, 1, Appendix A, 1845, p. 629.—King, Mon. Perm. Foss., 1850, p. 34.—McCoy, British Pal. Foss., 1854, p. 49.—Hall, Amer. Jour. Sci. Arts, 2d ser., 23, 1857, pp. 203–204.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 165.—Eichwald, Leth. Rossica, 1, 1860, p. 356.—Nicholson, Pal. Province Ontario, 1874, p. 104.—Zittel, Handb. Pal., 1, Munich, 1880, p. 600.—Vine, Geol. Mag., dec. 2, 7, 1880, p. 511.—Shrubsole, Quart. Jour. Geol. Soc. London, 37, 1881, p. 179.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 150.—Claypole, Quart. Jour. Geol. Soc. London, 39, 1883, p. 31.—Vine, Proc. Yorkshire Geol. Polyt. Soc., n. s., 8, 1884, p. 164; Rep. 53d Meeting British Assoc. Adv. Sci., 1884, p. 190 (restricted).—Hall, Rep. State Geol. New York for 1884, 1885, p. 35.—Waagen and Pichl, Pal. Indica, ser. 13, 1885, pp. 773, 776.—Ulrich, Contr. Amer. Pal., 1, 1886, p. 4.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 83.—Hall and Simpson, Pal. New York, 6, 1887, p. 22.—Miller, N. A. Geol. Pal., 1889, p. 302.—Girty, Mon. U. S. Geol. Surv., 32, pt. 2, 1889, pp. 5, 18.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 395, 534.—Pocta, Syst. Sil. Boheme, 8, pt. 1, 1890, p. 40.—Whidborne, Devon. Fauna England (Pal. Soc. Publ.), 2, pt. 4, 1895, p. 165.—Simpson, 13th Ann. Rep. State Geol. New York for 1893, 1895, pp. 687, 724; 47th Ann. Rep. New York State Mus., pp. 881, 918.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 281.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 500.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 159.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 37, 244.—Grabau, Bull. New York State Mus., 45, 1901, p. 170; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 170.—Condra, Nebraska Geol. Surv., 2, pt. 1, 1903, p. 49.—Cumings, Amer. Jour. Sci., 17, 1904, pp. 49, 58; *ibid.*, 20, 1905, p. 169, pls. 5–7.—Hennig, Archiv. fur Zool., K. Sven. Vet.-Akad. Stockholm, 3, 1906, p. 1.—Cumings, 30th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 1276.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 50.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 142.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 746.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 175; Zittel-Eastman Textb. Pal., 1913, p. 341.

*Fenestrella* (in error for *Fenestella*) D'Orbigny, Prodr. de Pal., 1, 1850, p. 44.

*Actinostoma* Young and Young, Quart. Jour. Geol. Soc. London, 30, 1874, p. 681.—Vine, Proc. Yorkshire Geol. Polyt. Soc., 9, 1885, p. 84.

*Flabelliporina* Simpson, 13th Ann. Rep. State Geol. New York for 1893, 1895, pp. 703, 724; 47th Ann. Rep. New York State Mus., pp. 897, 918; 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 521.

**FENESTELLA ACMEA** Hall. See *Semicoscinium acmeum*.



**Fenestella acuticosta** Roemer.

*Fenestella acuticosta* Roemer, Sil. Fauna West. Tennessee, 1860, p. 30, pl. 2, figs. 15, 15a.

Niagaran (Brownsport): Perry County, Tennessee.

**Fenestella (Cycloporina) altidorsata** Ulrich and Bassler.

*Fenestella (Cycloporina) altidorsata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 282, pl. 45, fig. 15; pl. 49, figs. 1-3.

Helderbergian (Keyser): Devils Backbone, near Cumberland, Maryland.

*Cotypes*.—Cat. No. 60749, U.S.N.M.

FENESTELLA AMBIGUA Hall. See *Loculipora ambigua*.

FENESTELLA ASPERA Hall. See *Chasmatopora aspera*.

**Fenestella bellistriata** Hall.

*Fenestella bellaistriata* Hall, Trans. Albany Inst., 10, 1883, p. 63 (abstract, 1879, p. 7); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 252.—Ulrich, Geol. Surv. Illinois, 8, 1890, pl. 54, fig. 2.

Niagaran (Waldron): Waldron, Indiana.

*Plesiotype*.—Cat. No. 44081, U.S.N.M.

**Fenestella bicornis** Spencer.

Not recognizable.

*Fenestella bicornis* Spencer, Trans. St. Louis Acad. Sci., 4, 1884, p. 604, pl. 7, fig. 2; Bull. Mus. Univ. State Missouri, 1, 1884, p. 55, pl. 7, 2.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 247.

Clinton: Hamilton, Ontario.

FENESTELLA CONFERTA Hall. See *Polypora conferta*.

**Fenestella cribrosa** Hall.

*Fenestella cribrosa* Hall, Pal. New York, 2, 1852, p. 166, pl. 40D, figs. 3a, b.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 50, 51, pl. 19, figs. 3-5.

Clinton (Rochester): Lockport and Middleport, New York.

*Plesiotype*.—Cat. No. 35553, U.S.N.M.

**Fenestella cumberlandica** Ulrich and Bassler.

*Fenestella cumberlandica* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 280, pl. 47, figs. 1, 2.

Helderbergian (Keyser): Cash Valley, etc., near Cumberland, Maryland.

*Cotypes*.—Cat. No. 60745, U.S.N.M.

**Fenestella elegans** Hall.

*Fenestella elegans* Hall, Pal. New York, 2, 1852, p. 164, pl. 40D, figs. 1a-g.—Chapman, Canadian Jour., n. s., 7, 1862, p. 109, fig. 87; *ibid.*, 8, 1863, p. 212, fig. 217; Expos. Min., Geol. Canada, 1864, p. 112, fig. 87; p. 184, fig. 217.—Grabau, Bull. New York State Mus., 45, 1901, p. 170, fig. 70; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 170, fig. 70.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 51, pl. 19, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 142, fig. 198.

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario.

FENESTELLA FLABELLIFORMIS Eichwald. See *Dictyonema flabelliforme*.

FENESTELLA GRACILIS Hall. See *Chasmatopora gracilis*.

**Fenestella granulosa** Whitfield.

*Fenestella granulosa* Whitfield, Ann. Rep. Geol. Surv. Wisconsin for 1877, 1878, p. 68; Geol. Surv. Wisconsin, 4, 1882, p. 252, pl. 12, figs. 1, 2.—Buel, Trans. Wisconsin Acad. Sci., 5, 1882, p. 187.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 173, fig.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 835, pl. 29, figs. 7, 7a.

*Fenestella oxfordensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 159, pl. 6, fig. 13.

Richmond: Delafield, etc., Wisconsin (Maquoketa); Oxford, etc., Ohio (Waynesville-Whitewater).

*Plesiotype*.—Cat. No. 43635, U.S.N.M. (Holotype of *F. oxfordensis*.)

**FENESTELLA INCEPTA** Hall. See *Chasmatopora incepta*.

**FENESTELLA NERVATA** Nicholson. See *Ptiloporella nervata*.

**FENESTELLA OXFORDENSIS** Ulrich. See *Fenestella granulosa*.

**Fenestella parvulipora** Hall.

*Fenestella parvulipora* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 12, figs. 1-9; *ibid.*, Mus. ed., 1879, p. 123, pl. 12, figs. 1-9; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 249, pl. 11, figs. 1-9.

Niagaran (Waldron): Waldron, Indiana.

**Fenestella pertenuis** Hall.

*Fenestella pertenuis* Hall, Trans. Albany Inst., 10, 1883, p. 62 (abstract, 1879, p. 6); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 251.

Niagaran (Waldron): Waldron, Indiana.

**FENESTELLA PRISCA?** Hall. See *Semicoscinium tenuiceps*.

**Fenestella proluxa** Hall.

*Fenestella proluxa* Hall, Trans. Albany Inst., 10, 1883, p. 64 (abstract, 1879, p. 8); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 253.

Niagaran (Waldron): Waldron, Indiana.

**FENESTELLA PUNCTOSTRIATA** Hall. See *Polypora punctostriata*.

**Fenestella subarctica** Whiteaves.

*Fenestella subarctica* Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 39; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 249, pl. 23.

Niagaran: Ekwan River, Canada.

**FENESTELLA TANTULUS** Hall. See *Polypora tantula*.

**FENESTELLA TENUICEPS** Hall. See *Semicoscinium tenuiceps*.

**Fenestella tenuis** Hall.

*Fenestella tenuis* Hall, Pal. New York, 2, 1852, p. 51, pl. 19, figs. 5a-c.

Clinton: Wolcott Furnace, Whiting's Mill, Wayne County, New York.

**FISTULIPORA** McCoy.

Genotype: *Fistulipora minor* McCoy = *Calamopora incrustans* Phillips.

*Fistulipora* McCoy, Ann. Mag. Nat. Hist., 2d ser., 3, 1850, p. 131, figs. a, b.—Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 219.—McCoy, British Pal. Foss., 1854, p. 11; Contr. British Pal., 1854, p. 99.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 438.—Billings, Canadian Nat. Geol., 3, 1858, p. 419; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 165; Canadian Jour., n. s., 4,



**FISTULIPORA**—Continued.

- 1859, p. 97.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 238.—Nicholson, Pal. Prov. Ontario, 1874, p. 63.—Dybowski, Verh. Mineral. Gesell. St. Petersburg (2), 10, 1876, p. 180.—Lindstrom, Ann. Mag. Nat. Hist., ser. 4, 18, 1876, p. 6.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 38.—Nicholson, Pal. Tabulate Corals, 1879, p. 292.—Zittel, Handb. d. Pal., 1, 1880, p. 616; Genus Monticulipora, 1881, p. 91.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 477; Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 43.—Thompson, Proc. Phil. Soc. Glasgow, 14, 1883, p. 351.—Nicholson and Foord, Ann. Mag. Nat. Hist., 5th ser., 16, 1885, p. 500.—Waagen and Wentzel, Pal. Indica, 13th ser., 1886, pp. 909, 922.—Hall and Simpson, Pal. New York, 6, 1887, p. 18.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 32.—Miller, N. A. Geol. Pal., 1889, p. 305.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 382, 474.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 119.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 269; p. 105 (not Ulrich).—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 559.—Lindstrom, Kongl. Sven. Vet. Akad. Handl., 32, 1899, pp. 48, 52.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 25, 266.—Condra, Nebraska, Geol. Surv., 2, pt. 1, 1903, p. 29.—Cumings, 30th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 1292.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 22.—Grabau and Shimer, N. A. Index Fossils, 1, p. 124.—Hennig, Archiv. für Zool., 4, pt. 21, 1908, p. 16.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 329.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 262.
- Didymopora* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156.
- Dybowskia* Waagen and Pichl, Pal. Indica, ser. 13, p. 717.
- Dybowskiella* Waagen and Wentzel, Pal. Indica, 13th ser., 1886, pp. 910, 916.—Stuckenberg, Mem. du Comité Geologique Russia, 10, 3, 1895, p. 22.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, 1899, pp. 52, 53.
- Lichenalia* (not Hall, 1852) Hall and Simpson, Pal. New York, 6, 1887, p. xvi.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 168.—Miller, N. A. Geol. Pal., 1889, p. 311.—Simpson, 14th Ann. Rep. State Geologist New York for 1894, 1897, p. 559.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1889, p. 171.

**Fistulipora crustula** Bassler.

- Ceramopora* *incrusters* Hall, Pal. New York, 2, 1852, p. 169, pl. 40E, figs. 2a-d.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 198.—Grabau, Bull. New York State Mus., 45, 1901, p. 163, fig. 59; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 163, fig. 59.
- Fistulipora crustula* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 24, pl. 7, figs. 7-10; pl. 8, figs. 16, 17; pl. 23, fig. 15.
- Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby, Ontario.
- Cotypes*.—Cat. No. 35481, U.S.N.M.

**FISTULIPORA FLABELLATA** Ulrich. See *Chiloporella flabellata*.

**Fistulipora halli** Rominger.

- Fistulipora Halli* Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 119.
- Lichenalia concentrica* var. *parvula* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 7, figs. 1, 2; *ibid.*, mus. ed., 1879, p. 117, pl. 7, figs. 1, 2; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 241, pl. 6, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 340, figs.
- Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

**Fistulipora hemispherica** (Roemer).

*Thecostegites hemisphericus* Roemer, Sil. Fauna West. Tennessee, 1860, p. 25, pl. 2, figs. 3, 3a.—Miller, N. A. Geol. Pal., 1889, fig. 228 (p. 207).

*Fistulipora hemispherica* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 270.

*Fistulipora* (*Thecostegites*) *hemispherica* Foerste, Jour. Geol., 11, 1903, p. 712 (loc. occ.).

Niagaran (Brownsport): Perry and Wayne Counties, Tennessee.

**Fistulipora laminata** (Hall).

*Callopora laminata* Hall, Pal. New York, 2, 1852, p. 146, pl. 40, figs. 3a-e.

*Leioclema? laminatum* Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 416, 425.

*Leioclema* (?*Nicholsonella*) *laminatum* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 304.

*Fistulipora laminata* Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 22, 23, pl. 7, figs. 4-6; pl. 8, figs. 9, 10.

Clinton (Rochester): Lockport and Rochester, New York; Grimsby, Ontario.

*Plesiotype*.—Cat. No. 35467, U.S.N.M.

**FISTULIPORA? LAXATA** Ulrich. See *Favositella laxata*.

**FISTULIPORA LENS** Whitfield. See *Calloporella? lens*.

**Fistulipora lockportensis** Bassler.

*Fistulipora lockportensis* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 23, pl. 7, figs. 1-3.

Clinton (Rochester): Lockport and Rochester, New York.

*Cotypes*.—Cat. No. 35489, U.S.N.M.

**Fistulipora? multipora** James.

*Fistulipora? multipora* James, Paleontologist, 1, 1878, p. 2.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 38.

Cincinnati: Cincinnati, Ohio, and vicinity.

Observation.—Not a valid species. Insufficiently described and types include a variety of forms.

**Fistulipora neglecta** Rominger.

*Fistulipora neglecta* Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 119.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 272.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 125.

*Lichenalia concentrica* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 5, figs. 9-16; pl. 6, figs. 1, 2, 4, 7-10; pl. 7, figs. 3-11; *ibid.*, mus. ed., 1879, p. 116, pl. 5, figs. 9-16; pl. 6, figs. 1, 2, 4, 7-10; pl. 7, figs. 3-11.—Quenstedt, Roehren- und Sternkorallen, 1881, p. 95, pl. 146, 71, 72.—Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 240, pl. 4, figs. 9-16; pl. 5, figs. 1, 2, 4, 7-10; pl. 6, figs. 3-11.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, pl. 3, fig. 5.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 168, pl. 17, 10.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

**Fistulipora neglecta maculata** (Hall).

*Lichenalia concentrica* var. *maculata* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 6, figs. 3, 5, 6; *ibid.*, mus. ed., 1879, p. 117, pl. 6, figs. 3, 5, 6; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 241, pl. 5, figs. 3, 5, 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 340, fig.

*Fistulipora neglecta-maculata* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 272.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.



**FISTULIPORA OWENI** James. See *Coeloclema oweni*.

**FISTULIPORA RUGOSA** Whitfield. See *Batostoma? rugosum*.

**Fistulipora siluriana** James.

*Fistulipora siluriana* James, Paleontologist, No. 3, 1879, p. 19.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 39.

Cincinnatian: Cincinnati, Ohio, and vicinity.

Observation.—Not a valid species. The types are not figured, are insufficiently described, and proved upon examination to include several distinct species.

**FISTULIPORA SOLIDISSIMA** Whitfield. See *Lioclemella solidissima*.

**Fistulipora tuberculosa** (Hall).

*Rhinopora tuberculosa* Hall, Pal. New York, 2, 1852, p. 170, pl. 40E, figs. 4a-c.—Grabau, Bull. New York State Mus., 45, 1901, p. 175, fig. 77; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 175, fig. 77.

*Fistulipora tuberculosa* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 23, pl. 7, figs. 11-15; pl. 8, figs. 7, 8; pl. 23, fig. 14.

Clinton (Rochester): Lockport, New York; Grimsby, Ontario.

Thin sections of *holotype* and *plesiotype*.—Cat. Nos. 35485, 35486, U.S.N.M.

**FISTULIPORELLA** Simpson. Genotype: *F. constricta* Hall and Simpson.

*Fistuliporella* Simpson, 14th Ann. Rep. State Geol. New York, 1897, p. 560.—

Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 262.

**Fistuliporella cumulata** Ulrich and Bassler.

*Fistuliporella cumulata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 263, pl. 41, figs. 1-5.

Helderbergian (Keyser): Cash Valley and Pinto, Maryland; Keyser, West Virginia.

*Cotypes*.—Cat. No. 53661, U.S.N.M.

**Fistuliporella marylandica** Ulrich and Bassler.

*Fistuliporella marylandica* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 266, pl. 45, figs. 8-11; pl. 48, fig. 4.

Helderbergian (Keyser): Cash Valley, Maryland.

*Cotypes*.—Cat. No. 60756, U.S.N.M.

**Fistuliporella maynardi** Ulrich and Bassler.

*Fistuliporella maynardi* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, pl. 46, figs. 3-7.

Helderbergian (Keyser): Cash Valley, Maryland.

*Cotypes*.—Cat. No. 60755, U.S.N.M.

**Fistuliporella minima** Ulrich and Bassler.

*Fistuliporella minima* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 265, pl. 43, figs. 13-16.

Helderbergian (Keyser): Cash Valley, Maryland; Keyser, West Virginia.

*Holotype*.—Cat. No. 53659, U.S.N.M.

**Fistuliporella quinquedentata** Ulrich and Bassler.

*Fistuliporella quinquedentata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 264, pl. 41, figs. 6-8.

Helderbergian (Keyser): Keyser, West Virginia.

*Holotype*.—Cat. No. 53660, U.S.N.M.

**FLABELLOPORELLA** Simpson. See *Polypora* McCoy.

**FLABELLIPORINA** Simpson. See *Fenestella* Lonsdale.

**FLETCHERIA** Edwards and Haime. Genotype: *F. tubifera* Edwards and Haime.

*Fletcheria* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 156, 300.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 446.—Milne-Edwards, Hist. Nat. d. Corall, 3, 1860, p. 300.—Duncan, Rep. 41st Meeting British Assoc. Adv. Sci., 1872, p. 130.—Lindstrom, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 13.—Zittel, Handb. Pal., 1, 1879, p. 235.—Nicholson, Tab. Corals Pal. Period, 1879, p. 206.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 488.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1889, p. 47.—Sherzer, Amer. Geol., 7, 1891, pp. 296–301.

**Fletcheria incerta** (Billings).

*Columnaria incerta* Billings, Canadian Nat. Geol., 4, 1859, p. 428, fig. 1, 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 124, fig. 44, a, b.  
*Fletcheria incerta* Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 48, pl. 1, figs. 8, 8a, 9.  
Chazyan: Mingan Islands, Island of Montreal, etc., Quebec; Ottawa, Ontario.

**FRAMMIA** Hortedahl.

Genotype: *F. dissimilis* Hortedahl.

*Frammia* Hortedahl, 2d Arct. Exp. Fram, 1898–1902, No. 32, 1914, p. 35.

**Frammia dissimilis** Hortedahl.

*Frammia dissimilis* Hortedahl, 2d Arct. Exp. "Fram," 1898–1902, No. 32, 1914, p. 35, pl. 8, figs. 17, 18, ?19.  
Helderbergian (Lower beds): Southwestern Ellesmereland, Arctic America.

**FUCOIDES ALLEGHANIENSIS** Taylor. See *Arthropycus alleghaniensis*.

**Fucoides auriformis** Hall.

*Fucoides auriformis* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 47, pl. 1, fig. 2; Pal. New York, 2, 1852, p. 7, pl. 3, fig. 3.  
Upper Medinan: Medina, etc., New York.  
Observation.—Probably a burrow.

**FUCOIDES BILOBA** Vanuxem. See *Rusophycus biloba*.

**FUCOIDES BRONGNIARTII** Harlan. See *Arthropycus alleghaniensis*.

**FUCOIDES DEMISSUS** Vanuxem. See *Phytopsis tubulosa*.

**FUCOIDES DENTATUS** Brongniart. See *Diplograptus dentatus* and *Diplograptus foliaceus*.

**FUCOIDES HARLANI** Vanuxem. See *Arthropycus alleghaniensis*.

**Fucoides heterophyllus** Hall.

*Fucoides heterophyllus* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 47, pl. 1, fig. 3; Pal. New York, 2, 1852, p. 7, pl. 3, fig. 4.  
Upper Medinan: Medina, etc., New York.  
Observation.—Probably a burrow.

**FUCOIDES LINEARIS** Haldemann. See *Scolithus linearis*.

**FUCOIDES SERRA** Brongniart. See *Tetragraptus serra*.

**FUCOIDES SIMPLEX** Emmons. See *Diplograptus foliaceus*.

**FUNGISPONGIA** Ringueberg.

Genotype: *F. irregularis* Ringueberg.

*Fungispongia* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 147.



**Fungispongia irregularis** Ringueberg.

*Fungispongia irregularis* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 147, pl. 3, fig. 3.

Lower Clinton: Lockport, New York.

**FUSISPIRA** Hall.

Genotype: *F. ventricosa* Hall.

*Fusispira* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 229 (Extract, 1871, p. 5).—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 315, 316.—Zittel, Handb. Pal., 2, 1882, p. 239.—Miller, N. A. Geol. Pal., 1889, p. 404.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1075.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697.

**Fusispira angusta** Ulrich and Scofield.

*Fusispira angusta* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1079, pl. 81, figs. 28–31.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002e.

Trenton: Near Cannon Falls and near Fountain, Minnesota (Prosser); near Burgin, Kentucky.

*Cotypes*.—Cat. No. 45811, U.S.N.M.

**Fusispira angusta subplana** Ulrich and Scofield.

*Fusispira angusta* var. *subplana*, Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1079, pl. 81, fig. 32.

Trenton (Prosser): Near Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 43812, U.S.N.M.

**Fusispira calcifera** (Billings).

*Subulites calcifera* Billings, Canadian Nat. Geol., 4, 1859, p. 360, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 120, fig. 34.—Miller, N. A. Geol. Pal., 1889, p. 428, fig. 717.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1142, fig.

*Fusispira calcifera* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070 (gen. ref.).

Canadian (Romaine): Mingan Islands, Quebec.

**Fusispira compacta** Hall and Whitfield.

*Fusispira compacta* Hall and Whitfield, U. S. Geol. Expl. 40th Paral., 4, 1877, p. 236, pl. 1, fig. 25.

Pogonip: Pogonip Mountain, White Pine District, Nevada.

*Holotype*.—Cat. No. 17365, U.S.N.M.

**Fusispira convexa** Ulrich and Scofield.

*Fusispira convexa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1077, pl. 80, figs. 8–10.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002d.

Trenton: Trenton Falls, New York; near Cannon Falls, Minnesota (Prosser).

*Cotypes*.—Cat. Nos. 45813, 45814, U.S.N.M.

**Fusispira daphne** (Billings).

*Subulites Daphne* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 223, fig. 206.

*Fusispira daphne* Ulrich and Scofield, Geol. Minnesota, 1897, p. 1070 (gen. ref.). Chazy (Quebec—L): Point Rich, Newfoundland.

**Fusispira elongata** Hall.

*Fusispira elongata* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 8, fig. 5, p. 229 (Extract, 1871, p. 6).—Whitfield, Geol. Wisconsin, 4, 1882, p. 245, pl. 9, fig. 3.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 167, fig.—Whiteaves, Pal. Fossils, Geol. Surv. Canada, 3, pt. 3, 1897, p. 200 (loc. occ.).  
Trenton: Elkader, Iowa (Prosser); Lower Fort Garry, Manitoba.

**Fusispira inflata** (Meek and Worthen).

*Subulites inflatus* Meek and Worthen, Proc. Acad. Nat. Sci., Philadelphia, 1870, p. 47; Geol. Surv. Illinois, 6, 1875, p. 495, pl. 23, fig. 5.  
*Fusispira inflata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1075, pl. 80, figs. 17 and 18.—Whiteaves, Pal. Fossils, 1, Geol. Surv. Canada, 3, pt. 3, 1897, p. 199.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 168.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002a.  
Trenton: Carroll County, Illinois (Galena); Hader, Wykoff, etc., Minnesota (Prosser and Stewartville); Lake Winnipeg, Canada; Baffin Land.  
*Plesiotypes*.—Cat. Nos. 45815, 45816, U.S.N.M.

**Fusispira inflata ventricosa** (Hall).

*Fusispira ventricosa* Hall, 24th Rep. New York State Mus. Nat. Hist., 1872, p. 229, pl. 8, fig. 6 (extract, 1871, p. 5).—Whitfield, Geol. Wisconsin, 4, 1882, p. 245, pl. 9, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 405, fig. 676.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 328 (loc. occ.).  
*Fusispira inflata* var. *ventricosa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1075, pl. 80, figs. 17, 18.  
Trenton: Depere, West Jefferson, etc., Wisconsin; Stewartville, Wykoff, etc., Minnesota.

**Fusispira intermedia** Ulrich and Scofield.

*Fusispira intermedia* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1076, pl. 80, figs. 19–21.  
Trenton (Prosser and Stewartville): Stewartville and south of Cannon Falls, Minnesota.  
*Cotype*.—Cat. No. 45817, U.S.N.M.

**Fusispira nobilis** Ulrich and Scofield.

*Fusispira nobilis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1078, pl. 80, figs. 2–4.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 168.  
Trenton: Wykoff, Pleasant Grove, and Fountain, Minnesota (Prosser); Baffin Land.  
*Cotypes*.—Cat. No. 45818, U.S.N.M.

**Fusispira obesa** (Whitfield).

*Subulites obesus* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 318, pl. 26, fig. 7.  
*Fusispira obesa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070, (gen. ref.).  
Canadian (Beekmantown): Fort Cassin, Vermont.

**Fusispira planulata** Ulrich and Scofield.

*Fusispira planulata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1078, pl. 81, figs. 26, 27.  
Trenton (Prosser): Wykoff, Minnesota; Eagle Point, Iowa.  
*Holotype*.—Cat. No. 45819, U.S.N.M.



**Fusispira psyche** (Billings).

Subulites psyche Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 188, fig. 169.

Fusispira psyche Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070 (gen. ref.).

Canadian (Beekmantown): Near St. Antoine, above Quebec, Canada.

**Fusispira schucherti** Ulrich and Scofield.

Fusispira schucherti Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1076, pl. 80, fig. 1.

Black River (Platteville): Beloit, Wisconsin.

**Fusispira(?) spicula** Sardeson.

Fusispira(?) spicula Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 336, pl. 6, figs. 10, 11.

Black River (Decorah): Minneapolis, Minnesota.

**Fusispira subbrevis** Ulrich and Scofield.

Fusispira subbrevis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1076, pl. 80, figs. 11-16.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002b.

Trenton (Prosser and Stewartville): South of Cannon Falls and Stewartville, Minnesota; Decorah, Iowa.

Cotype.—Cat. No. 45820, U.S.N.M.

**Fusispira subfusiformis** (Hall).

Murchisonia subfusiformis Hall, Pal. New York, 1, 1847, p. 180, pl. 39, figs. 2a, b; 3d Rep. New York State Cab. Nat. Hist., 1850, p. 179, pl. 4, fig. 2 (doc. ed., p. 171).—Chapman, Canadian Jour., n. s., 7, 1862, p. 121, fig. 123; *ibid.*, 8, 1863, p. 199, fig. 190; Expos. Min., Geol. Canada, 1864, p. 124, fig. 123; p. 171, fig. 190.—Nicholson, Rep. Pal. Proc. Ontario, pt. 2, 1875, p. 18, fig. 7b.

Loxonema subfusiformis D'Orbigny, Prodr. de Pal., 1, 1849, p. 5 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 163.

Subulites subfusiformis Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 946 (gen. ref.).

Fusispira subfusiformis Hall, 24th Rep. New York State Cab. Nat. Hist., 1871, p. 229 (gen. ref.).—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 316.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1077, pl. 81, figs. 38, 39.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002c.

Trenton: Jefferson and Lewis Counties, New York; Goodhue and Fillmore Counties, Minnesota; Burgin, Kentucky; Canada.

Plesiotype.—Cat. No. 45821, U.S.N.M.

**Fusispira sulcata** Ulrich.

Fusispira sulcata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1077, pl. 81, figs. 5-7.

Fusispira cf. sulcata Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 137, pl. 3, figs. 4, 5.

Trenton (Upper): Rogers Gap and Covington, Kentucky.

Holotype.—Cat. No. 45822, U.S.N.M.

**Fusispira terebriformis** Hall.

Fusispira terebriformis Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 230, pl. 8, fig. 4 (Extract, 1871, p. 6).—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 316.

Eden (Economy): Cincinnati, Ohio.

**FUSISPIRA VENTRICOSA** Hall. See *Fusispira inflata ventricosa*.

**Fusispira vittata** (Hall).

*Murchisonia vittata* Hall, Pal. New York, 1, 1847, p. 181, pl. 39, figs. 3a, b.

*Loxonema vittata* D'Orbigny, Prodr. de Pal., 1, 1849, p. 5 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 163.

*Fusispira vittata* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 229 (Extract, 1871, p. 5).

Trenton: Adams, Jefferson County, New York.

**GAUROCRINUS** Miller. See *Reteocrinus* Billings.

**GAUROCRINUS** *ANGULARIS* Miller. See *Ptychocrinus parvus*.

**GAUROCRINUS** *COGNATUS* Miller. See *Reteocrinus nealli*.

**GAUROCRINUS** *SPLENDENS* Miller. See *Ptychocrinus splendens*.

**GAZACRINUS** Miller.

Genotype: *G. inornatus* Miller.

*Gazacrinus* Miller, 18th Rep. Geol. Surv. Indiana, 1894, p. 305 (adv. sheets, 1892, p. 49); N. A. Geol. Pal., 1st App., 1892, p. 679; *ibid.*, 2d App., 1897, p. 746.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 78, fig. 38 (includes notes on synonymy).—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188, fig. 119.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 187.

*Idiocrinus* Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 135; Mem. Mus. Comp. Zool. Harvard (N. A. Crin. Camerata), 20, 1897, p. 202.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 188.—Zittel, Grundzuge Pal., 1, 1910, p. 161. (Genotype: *I. elongatus* Wachsmuth and Springer.)

**Gazacrinus immaturus** (Hall).

*Thysanocrinus immaturus* Hall, Pal. New York, 2, 1852, p. 191, pl. 42, figs. 4a-f. *Rhodocrinus* (*Thysanocrinus*) *immaturus* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 398.

*Dimerocrinus immaturus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 373 (Rev. Pal., pt. 2, p. 199).

*Idiocrinus immaturus* Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 206, pl. 18, figs. 10a-c.

Clinton (Rochester): Lockport, New York.

**Gazacrinus inornatus** Miller.

*Gazacrinus inornatus* Miller, 18th Rep. Indiana Dept. Geol. Nat. Res., 1894, p. 303, pl. 5, figs. 9, 10, 15-17 (adv. sheets, 1892, p. 49, pl. 5, figs. 9, 10, 15-17); N. A. Geol. Pal., 1st App., 1892, p. 679, figs. 1232-33.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188, fig. 119, 1.

*Idiocrinus elongatus* Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 136; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 203, pl. 18, figs. 8a-c.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 126.

Niagaran (Laurel): St. Paul, Shelby County, Indiana.

**Gazacrinus major** Weller.

*Gazacrinus major* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 78, pl. 3, figs. 1, 2.

Niagaran (Racine): Hawthorne, Illinois.

**Gazacrinus milliganæ** (Miller and Gurley).

*Thysanocrinus milliganæ* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 8, 1896, p. 51, pl. 3, figs. 23-25.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 754, fig. 1403.

Niagaran (Brownsport): Decatur County, Tennessee.



**Gazacrinus minor** Weller.

*Gazacrinus minor* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 80, pl. 3, figs. 3, 4.

Niagaran (Racine): Bridgeport, Illinois.

**Gazacrinus ventricosus** (Wachsmuth and Springer).

*Idiocrinus ventricosus* Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 137; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 205, pl. 18, fig. 9a, b.

*Gazacrinus ventricosus* Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188, fig.

Niagaran (Laurel): St. Paul, Shelby County, Indiana.

**GEINITZELLA** Waagen and Wentzel. See *Batostomella* Ulrich.

**GEISONOCERAS** Hyatt.

Genotype: *Orthoceras rivale* Barrande.

*Geisonoceras* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 275; Zittel-Eastman Textb. Pal., 1, 1900, p. 518; *ibid.*, 2d ed., 1913, p. 593.

**Geisonoceras shumardi** (Billings).

*Orthoceras shumardi* Billings, Can. Nat. Geol., 4, 1859, p. 460, fig. 36.

*Geisonoceras shumardi* Ruedemann, Bull. New York State Mus., 90, 1906, p. 437, pl. 12, fig. 4.

*Orthoceras* (*Geisonoceras*) *shumardi* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 48.

Chazy: Mingan Islands, Canada (Mingan); Chazy, New York (Day Point, Crown Point).

**GEOCRINUS** D'Orbigny. See *Periechocrinus* Austin.

**GERASAPHES** Clarke.

Genotype: *G. ulrichana* Clarke.

*Gerasaphes* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 710.

**Gerasaphes ulrichana** Clarke.

*Gerasaphes ulrichana* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 710, figs. 14-16.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 788.—Ruedemann, Bull. New York State Mus., 49, 1906, p. 60.

Trenton (Upper): Mouth of Licking River, Covington, Kentucky.

*Holotype*.—Cat. No. 41951, U.S.N.M.

**GILBERTSOCRINITES AMERICANUS** Troost. See *Diabolocrinus vesperalis*.

**GILBERTSOCRINITES(?) DUBIUS** Troost. See *Periechocrinus dubius*.

**GILBERTSOCRINITES ROEMERI** Troost. See *Dimerocrinus roemeri*.

**GIRVANELLA** Nicholson and Etheridge.

Genotype: *G. problematica* Nicholson and Etheridge.

*Girvanella* Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 23, pl. 9, fig. 24.—Nicholson, Geol. Mag., dec. 3, 4, 1888, p. 22.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, pp. 50, 51.—Dawson, Canadian Rec. Sci., 7, 1896, p. 212.

*Strophochetus* Seely, Amer. Jour. Sci. Arts, 3d ser., 30, 1885, p. 357; *ibid.*, 32, 1886, p. 31.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 91.—Hinde, Geol. Mag., dec. 3, 4, 1887, p. 227.—Miller, N. A. Geol. Pal., 1889, p. 165.—Seely, Rep. State Geol. Vermont, 3, 1902, p. 156. (Genotype: *S. ocellatus* Seely.)

**Girvanella antiqua** Dawson.

*Girvanella antiqua* Dawson, Canadian Rec. Sci., 7, 1896, p. 214.

Cambrian or Lower Ordovician bowlder: Little Metis, Quebec.

**Girvanella atrata** (Seely).

*Strephochetus atratus* Seely, Amer. Jour. Sci. Arts, 3d ser., 32, 1886, p. 32; Rep. State Geol. Vermont, 3, 1902, p. 157, pl. 57, fig. 1, pl. 58, fig. 9.

Chazyan (Crown Point): McBrides Bay, South Hero, Vermont; Chazy, New York.

**Girvanella brainerdi** (Seely).

*Strephochetus Brainerdi* Seely, Amer. Jour. Sci. Arts, 3d ser., 32, 1886, p. 32; Rep. State Geol. Vermont, 3, 1902, p. 156, pl. 57, figs. 2, 58, figs. 7, 8.

Chazyan (Crown Point): Chazy, New York.

Observation.—See *G. ocellata* (Seely).

**GIRVANELLA LABYRINTHICA** Ulrich. See *Streptospongia labyrinthica*.

**Girvanella ocellata** (Seely).

*Strephochetus ocellatus* Seely, Amer. Jour. Sci. Arts, 3d ser., 30, 1885, p. 357, figs. 1-3; Amer. Jour. Sci., 3d ser., 32, 1886, p. 31.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1083.—Dawson, Canadian Rec. Sci., 7, 1896, p. 213.—Seely, Rep. State Geol. Vermont, 3, 1902, p. 156, pls. 56, 57, figs. 3, 4, 59.

Chazyan: Addison County, Vermont; Crown Point, New York (Crown Point); East Tennessee (Lenoir).

Observation.—*Girvanella brainerdi* and *G. prunus* Seely are probably synonyms of this species.

**Girvanella prunus** (Seely).

*Strephochetus prunus* Seely, Rep. State Geol. Vermont, 3, 1902, p. 160, pl. 57, fig. 5; pl. 58, fig. 6.

Chazyan (Crown Point): South Hero and Isle La Motte, Vermont; Chazy, New York.

Observation.—See *G. ocellata* (Seely).

**Girvanella richmondensis** (Miller).

*Stromatocerium richmondense* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 41, pl. 2, figs. 1, 1a, 1b.—James, J. F., *ibid.*, 9, p. 252.

*Girvanella richmondense* James, J. F., *ibid.*, 14, pt. 1, 1891, p. 51.

*Strephochetus richmondense* Seely, Amer. Jour. Sci. Arts, 3d ser., 32, 1886, p. 33.—Miller, N. A. Geol. Pal., 1889, p. 165, fig. 122.—Seely, Rep. State Geol. Vermont, 3, 1902, p. 157.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 706, pl. 2, figs. 3-3b.

Richmond (Whitewater): Richmond, Indiana.

**GISSOCRINUS** Angelin.

Genotype: *Actinocrinus arthriticus* Phillips.

*Gissocrinus* Angelin, Icon. Crinoid., 1878, p. 10, pl. 3, figs. 1-3, 5b; pl. 29, fig. 75.—Zittel, Handb. Pal., 1, 1879, p. 353.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 312 (Rev. Pal., pt. 1, p. 89); *ibid.*, 1886, pp. 115, 151; *ibid.*, 1889, pp. 285, 312.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 21; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 152; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 175, fig. 90; Amer. Geol., 26, 1900, p. 308.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 156.—Zittel, Grundzüge Pal., 1, 1910, p. 154.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 220.

**Gissocrinus? problematicus** Rowley.

*Gissocrinus? problematicus* Rowley, Amer. Geol., 34, 1904, p. 277, pl. 16, figs. 37-41.

Upper Medinan (Edgewood): Three miles west of Louisiana, Missouri.



**GLADIOLITES VENOSUS** Gurley. See *Retiolites geinitzianus venosus*.

**GLAPHURUS** Raymond.

Genotype: *Arionellus pustulatus* Walcott.

*Glaphurus* Raymond, *Annals Carnegie Mus.*, 3, 1905, p. 357.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 313.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 723.

**GLAPHURUS PRIMUS** Raymond. See *Cybeloides primus*.

**Glaphurus pustulatus** (Walcott).

*Arionellus pustulatus* Walcott, 31st Ann. Rep. New York State Mus. Nat. Hist., 1879 (1880), (adv. sheets, 1877, p. 15), p. 68.

Sao(?) *Lamottensis* Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 1, 1881, p. 334, pl. 33, figs. 9-11.—Brainerd and Seely, *Bull. Amer. Mus. Nat. Hist.*, 3, 1890, p. 22.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 925, figs.

*Agraulos* (*Arionellus*) *pustulatus* Vogdes, *Bull. U. S. Geol. Surv.*, No. 63, 1890, p. 90.

*Glaphurus pustulatus* Raymond, *Ann. Carnegie Mus.*, 3, 1905, p. 357, pl. 14, figs. 4-6, fig. 3; *ibid.*, 7, 1910, p. 74, pl. 18, figs. 9-11; 7th Rep. Vermont State Geol., 1910, p. 234, pl. 36, figs. 4-6; pl. 38, figs. 9-11.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 313, figs. 1625, 1626.—Perkins, *Rep. Vermont State Geol.*, 8th ser., 1912, pl. 18, figs. 9-11.

Chazyan (Crown Point, Valcour): Valcour Island, Sloop Island, Chazy, and Coopersville, New York; Isle La Motte, Vermont.

**GLASSIA** Davidson.

Genotype: *Atrypa obovata* Sowerby

*Glassia* Davidson, *Geol. Mag.*, n. s., 8, 1881, p. 11; *Sup. British Dev. and Sil. Brach.*, *Pal. Soc.*, 1882, p. 38.—Davidson, *Mon. British Foss. Brach.*, 5, *Sil. Suppl.*, *Pal. Soc.*, 1882, pp. 86, 116.—Miller, *N. A. Geol. Pal.*, 1889, p. 346.—Hall and Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 152, figs. 142-145; 13th Ann. Rep. New York State Geol., 1895, p. 811.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 238.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 409.

**GLASSIA HEADI** Miller. See *Catazyga headi*.

**Glassia romingeri** Hall and Clarke.

*Glassia romingeri* Hall and Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 153, pl. 83, figs. 32-35; 48th Rep. New York State Mus., 2, for 1895, 1897, p. 363, pl. 8, figs. 33-36; 14th Rep. State Geol. New York for 1894, 1877, p. 363, pl. 9, figs. 33-36.

Trenton: Drift near Ann Arbor, Michigan.

**GLASSIA SCHUCHERTANA** Ulrich. See *Catazya headi schuchertana*.

**Glassia variabilis** Whiteaves.

*Glassia variabilis* Whiteaves, *Geol. Surv. Canada*, Ann. Rep., n. s., 14, App. F. 1894, p. 42; *Geol. Surv. Canada*, *Pal. Foss.*, 3, pt. 4, 1906, p. 252, pl. 26, figs. 6-6b; p. 273; pl. 26, figs. 3-5; p. 277, pl. 26, figs. 7-9.

Niagaran: Winisk, Ekwan, and Fawn rivers, Canada.

**GLAUCOCRINUS** Parks and Alcock.

Genotype: *G. falconeri* Parks and Alcock.

*Glaucocrinus* Parks and Alcock, *The Ottawa Nat.*, 26, 1912, p. 43.

Observation.—Probably a synonym for *Anomalocrinus*.

**Glaucocrinus falconeri** Parks and Alcock.

*Glaucocrinus falconeri* Parks and Alcock, *The Ottawa Nat.*, 26, 1912, p. 43, pl. 4, figs. 1, 4.

Trenton (Curdsville): Kirkfield, Ontario.

**GLAUCONOME** Goldfuss.Genotype: *G. disticha* Goldfuss.

*Glaucanome* Goldfuss, *Petrefacta Germaniæ*, 1826, p. 100.—Lonsdale, Murchison's *Sil. Syst.*, 1839, p. 677.—Phillips, *Pal. Foss. Cornwall, Devon, and W. Somerset*, 1841, p. 21.—Etheridge, *Ann. Mag. Nat. Hist.*, 4th ser., 20, 1877, p. 32.—McCoy, *Syn. Char. Carb. Foss. Ireland*, 1844, p. 198.—Vine, *Rep. 53d Meeting British Assoc. Adv. Sci.*, 1884, p. 204.—Shrubsole and Vine, *Quart. Jour. Geol. Soc. London*, 1884, 40, p. 329.—Goldfuss, *Petrefacta*, 2d ed., pt. 1, 1862, p. 94.—Vine, *Rep. 50th Meeting British Assoc. Adv. Sci.*, 1880, p. 82; *Geol. Mag.*, dec. 2, 7, 1880, p. 507; *Rep. 51st Meeting British Assoc. Adv. Sci.*, 1882, p. 170.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, pp. 159, 160; *Zittel-Eastman Textb. Pal.*, 1913, p. 343.

*Penniretepora* D'Orbigny, *Prodr. de Pal.*, 1, 1850, p. 45.—Zittel, *Handb. Pal.*, 1, 1880, p. 603.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 150.

***Glaucanome strigosa*** (Billings).

*Helopora strigosa* Billings, *Catal. Sil. Foss. Anticosti*, 1866, p. 37.

*Nematopora*(?) *strigosa* Ulrich, *Amer. Geol.*, 1, 1888, p. 232, footnote; *Geol. Surv. Illinois*, 8, 1890, p. 645.

*Glaucanome strigosa* Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, pp. 161, 162, fig. 81. *Species No. 1.*—Wiman, *Bull.*, *Geol. Inst. Univ. Upsala*, 5, pt. 2, 1902, p. 181, pl. 6, figs. 29–33.

Silurian: Island of Anticosti, Canada (Charleton, Ellis Bay); Borkholm, Esthonia, Russia (Borkholm).

**GLOSSINA** Phillips. See *Lingula* subgenus *Palæoglossa* Cockerell.

**GLOSSINA ACUMINATA** Hall and Clarke. See *Lingulella* (*Lingulepis*) *acuminata* sequens.

**GLOSSINA CYANE** Schuchert. See *Obolus cyane*.

**GLOSSOCERAS** Barrande.Genotype: *G. gracile* Barrande.

*Glossoceras* Barrande, *Syst. Sil. du Centre Boheme*, 2, pt. 1, 1867, p. 372; *Cephalopodes: Ext. Syst. Sil. du Centre Boheme*, 1877, p. 118.—Hyatt, *Proc. Boston Soc. Nat. Hist.*, 22, 1884, p. 279.—Zittel, *Handb. Pal.*, 2, 1884, p. 373.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 253.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 23, No. 12, 1890, p. 33.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 49, fig. 32, fig. 2.—Hyatt, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 516; *ibid.*, 2d ed., 1913, p. 597.

***Glossoceras desideratum*** Billings.

*Glossoceras desideratum* Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 60.

Anticostian (Jupiter River): Southwest Point, Anticosti.

**GLOSSOGRAPTUS** Emmons. See *Glossograptus* Emmons.

**GLOSSOGRAPTUS** Emmons.Genotype: *G. ciliatus* Emmons.

*Glossograptus* Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 108.

*Glossograptus* Zittel, *Handb. Pal.*, 1, 1879, p. 302.—Miller, *N. A. Geol. Pal.*, 1889, p. 189.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 329.—Roemer and Frech, *Leth. geog.*, 1 Theil, *Leth. Pal.*, 1, 3 Lief. 1897, p. 631.—Elles and Wood, *Mon. British Grapt.*, *Pal. Soc.*, 1903, p. 38.—Ruedemann, *Mem. New York State Mus.*, 7, 1904, p. 724; *ibid.*, 11, pt. 2, 1908, pp. 375–379; *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 130.



**Glossograptus arthracanthus** Gurley.

*Diplograptus ciliatus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 105, pl. 1, fig. 19; Man. Geol., 1860, p. 87, fig. 65.

*Glossograptus arthracanthus* Gurley, Jour. Geol., 4, 1896, p. 78.

Normanskill or Early Trenton: Augusta County, Virginia.

**Glossograptus ciliatus** Emmons.

*Glossograptus ciliatus* Emmons, Amer. Geology, 1, pt. 2, 1856, p. 108, pl. 1, fig. 25.—Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 659, pl. 34, fig. 7; Roy. Soc. Canada Trans., 5, 4th sec., 1887, p. 184; Canadian Geol. Surv. Rep., 2d ser., 3, pt. 1, 1889, p. 95B.—Ami, Geol. Surv. Canada Rep., 2d ser., 3, pt. 2, 1889, p. 117K.—Gurley, Geol. Surv. Ark., Ann. Rep., 3, 1892, p. 404f.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 379–383, pl. 26, figs. 1–5; pl. 27, figs. 1–4, figs. 324–335.

*Diplograptus ciliatus* Walcott, Alb. Inst. Trans., 10, 1881 (adv. sheets, 1879, p. 34).

*Glossograptus setaceus* Emmons, Amer. Geology, 1, 1856, p. 236, pl. 1, fig. 20.

*Graptolithus spinulosus* Hall, Pal. New York, 3, 1859, p. 517, fig.; New York State Cab. Nat. Hist., 13th Ann. Rep., 1860, p. 60, fig.

*Glossograptus spinulosus* Lapworth, Ann. Mag. Nat. Hist., 5, 1880, p. 283.—Dodge, Amer. Jour. Sci., 3d ser., 40, 1890, p. 153.

*Diplograptus spinulosus* Walcott, Trans. Alb. Inst., 10, 1881, p. 35; Bull. Geol. Soc., 1, 1890, p. 339.

Chazy (Normanskill): Glenmont and other localities in slate belt of New York; Alabama; Long Point, St. Anne River, Quebec; Kicking Horse Pass and Dease River, British Columbia; Arkansas; Maine; North Wales.

**Glossograptus ciliatus debilis** Ruedemann.

*Glossograptus ciliatus* var. *debilis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 384, pl. 26, figs. 6, 7.

Chazy (Normanskill): Mount Moreno, near Hudson, New York.

**Glossograptus ciliatus horridus** Ruedemann.

*Glossograptus ciliatus* Emmons mut. *horridus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 383, 384, pl. 26, figs. 8, 9; pl. 27, fig. 5.

Canadian: Summit, Nevada.

*Holotype* and *paratype*.—Cat. No. 54254, U.S.N.M.

**GLOSSOGRAPTUS ECHINATUS** Ruedemann. See *Glossograptus hystrix*.

**GLOSSOGRAPTUS? EUCHARIS** Ruedemann. See *Lasiograptus* (*Thysanograptus*) *eucharis*.

**Glossograptus hystrix** Ruedemann.

*Glossograptus* sp. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 571.

*Glossograptus hystrix* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 724, 725, pl. 16, figs. 27–29, text fig. 101.

*Glossograptus echinatus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 725–726, pl. 16, figs. 30–32, fig. 102.

Canadian: Deepkill, Rensselaer County, and Mount Moreno, near Hudson, New York (Deepkill, *Diplograptus dentatus* zone); Arkansas.

**Glossograptus (Orthograptus) quadrimucronatus** (Hall).

*Graptolites dentatus* Vanuxem, Geol. New York, 3d Dist., 1842, p. 57, fig. 2.—Emmons, Geology New York, 2d Dist., 1842, p. 279, fig. 2.—Hall, *ibid.*, 4th Dist., 1843, p. 29.

**Glossograptus (Orthograptus) quadrimucronatus**—Continued.

*Graptolithus pristis* (in part) Hall, Pal. New York, 1, 1847, p. 265, pl. 57, figs. 1a-k.

*Diplograptus pristis* Ruedemann, Amer. Jour. Sci., 3d ser., 49, 1895, p. 453.—Wiman, Bull. Geol. Inst. Upsala, 5, 1895, p. 69.—Törnquist, Zool. Centralbl., 4, 1897, p. 4.

*Graptolithus quadrimucronatus* Hall, Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 144, pl. 13, figs. 1-10; New York State Cab. Nat. Hist., 20th Ann. Rep. 1868, pl. 3, figs. 1-5; rev. ed., 1870, p. 230; p. 224.—White, U. S. Geog. Surv. West 100th Merid., Wheeler's Rep., 4, Pal., 1877, p. 65, pl. 4, figs. 1a-b.—Walcott, Trans. Alb. Inst., 10 (adv. sheets, 1879, p. 35), 1881, p. 4 (loc. occ.).

*Diplograptus quadrimucronatus* Nicholson, Geol. Mag., 4, 1867, p. 111, pl. 7, figs. 1-8.—Lapworth, Geol. Mag., 6, 1877, p. 133, pl. 6, fig. 20; Belfast Nat. Field Club, Rep. and Proc., 1, 1876, App. 1877, p. 133, pl. 6, fig. 20.—Linnarsson, Sver. Geol. Und., ser. C, No. 41, 1879, p. 18.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 359.—Tullberg, Sver. Geol. Und., ser. C, No. 41, 1880, p. 18; *ibid.*, No. 50, 1882, p. 18.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 528.

*Diplograptus* (*Orthograptus*) *quadrimucronatus* T. S. Hall, Geol. Surv. Victoria Rec., 1, pt. 4, 1906, p. 275, pl. 34, figs. 10, 11.

*Orthograptus quadrimucronatus* Ami, Can. Rec. Sci., 1893, 5, pp. 180, 234; Geol. Surv. Canada, Summ. Rep., 1904, 1905, p. 12.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 633.

*Glossograptus* (*Orthograptus*) *quadrimucronatus* Ruedemann, Mem. New York State Mus., 2, pt. 2, 1908, pp. 385-392, fig. 336 (see pl. 26, figs. 10-15; pl. 27, figs. 6, 7).

*Orthograptus amii* Lapworth, Can. Surv. Ann. Rep., 1887, pp. 15K, 24K.

*Diplograptus foliaceus* (in part) Ruedemann, New York State Geol. Ann. Rep. for 1894, 1895, pl. 1, figs. 1, 5, 8, 9; pl. 2, fig. 6; pl. 3, figs. 1-26; Amer. Nat., 32, 1898, p. 6; Mem. New York State Mus., 7, 1904, p. 528, fig. 9.

*Diplograptus* aff. *whitfieldi* Roemer and Frech, Leth. Pal., 1, 1897, pl. A, figs. 1b, 1c.

Trenton: Lake St. John, Quebec, Montreal, north shore Lake Huron and Ottawa (Collingwood), and in belt girdling the Adirondacks; Great Britain (Hartfell); Scandinavia; Australia.

*Plesiotype*.—Cat. No. 8557, U.S.N.M.

**Glossograptus (Orthograptus) quadrimucronatus approximatus** Ruedemann.

*Glossograptus quadrimucronatus* var. *approximatus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 392, 393, pl. 26, figs. 10-15; pl. 27, figs. 6, 7, fig. 337.

Trenton (Canajoharie): Dolgeville, Mechanicsville, etc., New York.

**Glossograptus (Orthograptus) quadrimucronatus cornutus** Ruedemann.

*Glossograptus quadrimucronatus* var. *cornutus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 393, 394, pl. 27, figs. 8-10, figs. 338-342.

Trenton (Canajoharie): Rural cemetery, Albany, New York.

**Glossograptus (Orthograptus) quadrimucronatus postremus** Ruedemann.

*Glossograptus quadrimucronatus* mut. *postremus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 394, pl. 26, fig. 16, fig. 343.

Trenton (Canajoharie): Waterford, Frankfort, etc., New York.

**GLOSSOGRAPTUS SETACEUS** Emmons. See *Glossograptus ciliatus*.

**GLOSSOGRAPTUS SPINULOSUS** Lapworth. See *Glossograptus ciliatus*.



**Glossograptus whitfieldi** (Hall).

*Graptolithus whitfieldi* Hall, Pal. New York, 3, 1859, p. 516, fig. 1; New York State Cab. Nat. Hist., 13th Rep., 1860, p. 60, fig. 1; Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 31, fig. 29; p. 36, fig. 31; non pl. B, figs. 6-11; New York State Cab. Nat. Hist., 20th Rep., 1868, p. 199, fig. 31; p. 205, fig. 33; pl. 1, figs. 6-11; pp. 230, 236, 224.

*Diplograptus whitfieldi* Nicholson, Geol. Mag., 4, 1867, 111, pl. 7, figs. 4, 4a.

*Diplograptus whitfieldi* Nicholson, Mon. British Grapt., 1872, p. 54, fig. 23; p. 69, fig. 30b.—Lapworth, Cat. West. Scott. Foss., 1876, pl. 2, fig. 45; Belfast Field Club Ann. Rep. Proc., 2d ser., App., 1, pt. 4, p. 134, pl. 6, fig. 21.—Zittel, Handb. Pal., 1, 1879, p. 294, fig. 200.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 6, 1880, p. 21.—Walcott, Trans. Alb. Inst., 1883, 10 (adv. sheet, 1879, p. 35).—Lapworth, Roy. Soc. Can. Proc., Trans., 4, 1886, 184.—Ami, Geol. Sur. Can. Rep., ser. 2, 3, pt. 2, 1889, p. 117K.—Geinitz, Mitth. K. Min. Geol. praeh., Mus. Dresden, 9, 1890, 35, pl. A, fig. 52.—Gurley, Geol. Surv. Arkansas, Rep., 3, 1890, p. 411.—Walcott, Geol. Soc. Am. Bull., 1, 1890, 339.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 158.—Frech, Leth. Geog., 1, Theil. Leth. Pal., 1, 1897, p. 631, not fig. 192.—Ruedemann, Bull. New York State Mus., 42, 1901, pp. 497, 541.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 34.—Hoek, Neues Jahrb. Min. Geol. Pal., 14, 1912, p. 233, pl. 13, figs. 2, 3.

*Diplograptus* (*Graptolithus*) *whitfieldi* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 208, figs.

*Glossograptus whitfieldi* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 394-397, pl. 26, fig. 17, figs. 344, 345.

Chazy: Normanskill, Glenmont, Stockport, etc., New York; Canada; Arkansas (Normanskill); Great Britain (Glenkiln): Bolivia.

**GLYCERITES** Hinde.

Genotype: *G. sulcatus* Hinde.

*Glycerites* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 380.—Miller, N. A. Geol. Pal., 1889, p. 518.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 243.

**Glycerites calceolus** Hinde.

*Glycerites calceolus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 384, pl. 20, fig. 11.

Upper Medinan (Cataract): Toronto, Ontario.

**Glycerites sulcatus** Hinde.

*Glycerites sulcatus* Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 380, pl. 19, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 243, fig. 1528a. Cincinnati (Pulaski): Toronto, Ontario.

**Glycerites sulcatus excavatus** Hinde.

*Glycerites sulcatus* var. *excavatus*, Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 380, pl. 19, fig. 10.

Cincinnati (Pulaski): Toronto, Ontario.

**GLYPTASTER** Hall. See *Dimerocrinus* Phillips.

**GLYPTASTER** (**EUCRINUS**) **ANGULARIS** Wachsmuth and Springer. See *Ptychocrinus parvus*.

**GLYPTASTER ARMOSUS** Wachsmuth and Springer. See *Siphonocrinus armosus*.

**GLYPTASTER OCCIDENTALLIS** var. **CREBESCENS** Hall. See *Dimerocrinus occidentalis*.

**GLYPTOCERAS** Foerste. See *Cyrtoceras* Goldfuss.

**GLYPTOCRINITES** Carpenter. See *Glyptocrinus* Hall.

**GLYPTOCRINUS** Hall.

Genotype: *G. decadactylus* Hall.

*Glyptocrinus* Hall, Pal. New York, 1, 1847, p. 281.—McCoy, British Pal. Rocks, Foss., 1854, p. 56.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 223.—Billings, Canadian Nat. Geol., 1, 1856, p. 53; Geol. Surv. Canada, Rep. Progr., 1853–1856, 1857, p. 256; Geol. Surv. Canada, dec. 4, 1859, p. 55, fig. 18.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 372.—Zittel, Handb. Pal., 1, 1879, p. 374.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 30.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 246.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 356 (Rev. Pal., pt. 2, p. 182); *ibid.*, 1885, p. 324; *ibid.*, 1887, p. 105; *ibid.*, 1890, p. 353.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 259.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 217–219, 226.—Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 25, 1883, p. 255.—Carpenter, Phil. Trans. Royal Soc. London, 174, 1884, p. 929.—Miller, N. A. Geol. Pal., 1889, p. 247.—Dyche, Science, 20, 1892, p. 66.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, pp. 110, 111.—Bather, Treatise on Zool., 1897, p. 161.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 147.—Zittel, Grundzuge Pal., 1, 1910, p. 162.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 712.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 552.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 189.

*Reteocrinus* (part) Wachsmuth and Springer, Amer. Jour. Sci., 25, 1883, p. 266.

*Canistrocrinus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, pp. 310, 316 (Rev. Pal., 3, sec. 1, pp. 88, 94).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, pp. 104, 105.—Zittel, Grundzuge Pal., 1, 1910, p. 161.

*Glyptocrinites* Carpenter, Phil. Trans. Royal Soc. London, 174, 1884, p. 929.

**GLYPTOCRINUS ANGULARIS** Miller and Dyer. See *Ptychocrinus parvus*.

**GLYPTOCRINUS ARGUTUS** Walcott. See *Stelidiocrinus argutus*.

**GLYPTOCRINUS ARMOSA** Hall. See *Siphonocrinus armosus*.

**GLYPTOCRINUS (EUCALYPTOCRINUS) ARMOSUS** McChesney. See *Siphonocrinus armosus*.

**GLYPTOCRINUS BAERI** Meek. See *Xenocrinus baeri*.

**GLYPTOCRINUS BILLINGSI** Miller. See *Periglyptocrinus billingsi*.

**GLYPTOCRINUS CARLEYI** Hall. See *Mariocrinus carleyi*.

***Glyptocrinus circumcarinatus*** Parks and Alcock.

*Glyptocrinus circumcarinatus* Parks and Alcock, The Ottawa Nat., 26, 1912, p. 45, pl. 4, figs. 2, 3.

Trenton (Curdsville): Kirkfield, Ontario.

**GLYPTOCRINUS COGNATUS** Miller. See *Reteocrinus nealli*.

***Glyptocrinus decadactylus*** Hall.

*Glyptocrinus decadactylus* Hall, Pal. New York, 1, 1847, p. 281, pl. 77, figs. 1a–f; pl. 78, figs. 1a–u.—Christy, Letters on Geol., 1848, pl. 1, fig. 10.—Yandell, Proc. Amer. Assoc. Adv. Sci., 5, 1851, p. 234.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 821, fig. 622.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1860, p. 69.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p.



**Glyptocrinus decadactylus**—Continued.

- 207, fig. 2.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 30, pl. 2, figs. 5a, b.—Zittel, Handb. Pal., 1, 1879, p. 375, fig. 262.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 260, fig. 2.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 220, pl. 11, figs. 1a-c.—Roemer, Leth. Geog., 1 Theil, Leth. Pal., Atlas, 1883, pl. 3, fig. 19.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 254, fig.—Miller, N. A. Geol. Pal., 1889, p. 247, figs. 313-315.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 270, pl. 20, figs. 4a-e; pl. 21, figs. 4a-b.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 111.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 32, fig. 1; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 119, fig. 25.—Hayes and Ulrich, U. S. Geol. Surv., folio 95, illus. sheet, 1903, fig. 16.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 720, pl. 4, fig. 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 552, figs. 1882, 1883.
- Heterocrinus decadactylus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 223.
- Apiocrinite*(?) Anthony, Amer. Jour. Sci. Arts, 35, 1839, p. 360, text fig.
- Maysville (Fairmount): Cincinnati, Ohio, and vicinity; Indiana; Kentucky.
- Plesiotypes*.—Cat. Nos. 35409, 40768, etc., U.S.N.M.

**Glyptocrinus dyeri** Meek.

- Glyptocrinus dyeri* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 314; Geol. Surv. Ohio, Pal., 1, 1873, p. 32, pl. 2, figs. 2a, b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 222.—Dyche, *ibid.*, 15, 1892, p. 101; Science, 20, 1892, p. 66; Amer. Geol., 10, 1892, p. 130.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 112.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 271, pl. 20, figs. 1a-c; pl. 21, figs. 3a-c, fig. 6.—Springer, Mem. Mus. Comp. Zool., Harvard, 25, No. 2, 1905, pl. 1, fig. 13.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 722, pl. 4, fig. 8.
- Maysville (Corryville): Cincinnati, Ohio, and vicinity.
- Plesiotypes*.—Cat. No. 40762, 40767, U.S.N.M.

**Glyptocrinus dyeri sublævis** Miller.

- Glyptocrinus dyeri* var. *sublævis* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 103, pl. 3, fig. 2; *ibid.*, 1883, 7, p. 217.
- Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**GLYPTOCRINUS DYERI** var. **SUBGLOBOSUS** Meek. See *Glyptocrinus subglobosus*.

**Glyptocrinus? fimbriatus** Shumard.

- Glyptocrinus fimbriatus* Shumard, 1st-2d Ann. Rep. Geol. Surv. Missouri, pt. 2, 1855, p. 194, pl. A, fig. 10a, b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 227.
- Upper Medinan (Girardeau): Cape Girardeau County, Missouri.

**Glyptocrinus? fornshelli** Miller.

- Glyptocrinus fornshelli* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 348, fig. 41; *ibid.*, 6, 1883, p. 227; N. A. Geol., Pal., 1889, p. 248, fig. 316.—Keyes, Missouri Geol. Surv., 4, 1894, p. 162.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 276, pl. 20, fig. 3; pl. 21, fig. 5.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 114.
- Richmond (Waynesville): Near Morrow, Ohio.
- Plesiotype*.—Cat. No. 40771, U.S.N.M.

**GLYPTOCRINUS HARRISI** Miller. See *Compsocrinus harrisi*.

**Glyptocrinus insperatus** Rowley.

*Glyptocrinus insperatus* Rowley, Amer. Geol., 34, 1904, p. 275, pl. 16, figs. 34, 42, 43.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri.

**Glyptocrinus insperatus carinatus** Rowley.

*Glyptocrinus insperatus?* var. *carinatus* Rowley, Amer. Geol., 34, 1904, p. 278, pl. 16, fig. 56.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri.

**Glyptocrinus insperatus pentagonus** Rowley.

*Glyptocrinus insperatus* var. *pentagonus* Rowley, Amer. Geol., 34, 1904, p. 276, pl. 16, figs. 35, 36.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri.

**GLYPTOCRINUS LACUNOSUS** Billings. See *Archæocrinus lacunosus*.

**Glyptocrinus libanus** Safford.

*Glyptocrinus Libanus* Safford, Geol. Tennessee, 1869, p. 286 (nom. nud.).

Stones River: Lebanon, Tennessee.

**GLYPTOCRINUS MARGINATUS** Billings. See *Archæocrinus marginatus*.

**Glyptocrinus mercerensis** Miller and Gurley.

*Glyptocrinus mercerensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 28, pl. 2, fig. 23.

Trenton (Curdsville): Mercer County, Kentucky.

**GLYPTOCRINUS MIAMIENSIS** Miller. See *Compsocrinus miamiensis*.

**GLYPTOCRINUS NEALLI** Hall. See *Reteocrinus nealli*.

**GLYPTOCRINUS NOBILIS** Hall. See *Siphonocrinus nobilis*.

**Glyptocrinus ornatus** Billings.

*Glyptocrinus ornatus* Billings, Geol. Surv. Canada, Rep. Progress for 1853-56, 1857, p. 260; Geol. Surv. Canada, dec. 4, 1859, p. 60, pl. 9, fig. 2a, b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 225.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 274, pl. 20, fig. 6a, b.—Springer, Geol. Surv. Canada, Mem. 15P, 1911, p. 11 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**GLYPTOCRINUS PARVUS** Hall. See *Ptychocrinus parvus*.

**Glyptocrinus? pattersoni** Miller.

*Glyptocrinus pattersoni* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 80, pl. 3, fig. 2, 2a; *ibid.*, 6, 1883, p. 226.

*Reteocrinus Pattersoni* Wachsmuth and Springer, Amer. Jour. Sci. Arts, 25, 1883, p. 266.

*Canistrocrinus Pattersoni* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 317 (Rev. Pal., pt. 3, sec. 1, p. 95.).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 105.

Eden (Economy): Ohio River bank opposite Cincinnati, Ohio.

**Glyptocrinus plumosus** (Hall).

*Actinocrinus? plumosus* Hall, Nat. Hist. New York Geol., 4, 1843, p. 72.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 303, fig. 5.



**Glyptocrinus plumosus**—Continued.

*Glyptocrinus plumosus* Hall, Pal. New York, 2, 1852, p. 180, pl. 41A, figs. 3a-g.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 157, fig. 52; Bull. New York State Mus., 45, p. 157, fig. 52.

Lower Clinton: Near Medina, Reynale's Basin, and Lockport, New York.

**GLYPTOCRINUS PRISCUS** Billings. See *Periglyptocrinus priscus*.

**Glyptocrinus quinquepartitus** Billings.

*Glyptocrinus quinquepartitus* Billings, Geol. Surv. Canada, dec. 4, 1859, pl. 8, fig. 4a, 4b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 217.

Trenton: Ottawa, Ontario.

**Glyptocrinus ramulosus** Billings.

*Glyptocrinus ramulosus* Billings, Canadian Nat. Geol., 1, 1857, p. 49, fig. 1; p. 54, fig. 3; p. 55, fig. 4-8; Canadian Jour., n. s., 1, 1856, p. 165; Geol. Surv. Canada, Rep. Progr. for 1853-1856, p. 258; Geol. Surv. Canada, dec. 4, p. 57, pl. 7, figs. 2a-f; pl. 8, figs. 1a-e.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 224.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 273, pl. 20, fig. 5a-b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 552.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 11 (loc. occ.).

*Archæocrinus?* *ramulosus* Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 25, 1883, p. 265.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Mercer County, Kentucky.

**Glyptocrinus? richardsoni** Wetherby.

*Glyptocrinus richardsoni* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 245, pl. 16, fig. 1, 1a.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 227.

*Reteocrinus Richardsoni* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 367 (Rev. Pal., pt. 2, p. 193).

*Canistrocrinus Richardsoni* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 317 (Rev. Pal., pt. 3, sec. 1, p. 95).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 106.

Richmond: Wilmington, Ohio.

**GLYPTOCRINUS SCULPTUS** James. See *Rhaphanocrinus sculptus*.

**GLYPTOCRINUS SHAFFERI** Miller. See *Pycnocrinus shafferi*.

**GLYPTOCRINUS SHAFFERI** var. **GERMANUS** Miller. See *Pycnocrinus germanus*.

**GLYPTOCRINUS SIPHONATUS** Hall. See *Siphonocrinus armosus*.

**Glyptocrinus subglobosus** (Meek).

*Glyptocrinus Dyeri* var. *subglobosus* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 316; Geol. Surv. Ohio, Pal., 1, 1873, p. 34, pl. 2, fig. 2c.

*Glyptocrinus subglobosus* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 7.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 223.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 114.

*Reteocrinus subglobosus* Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 25, 1883, p. 265.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**GLYPTOCRINUS? SUBNODOSUS** Walcott. See *Rhaphanocrinus subnodosus*.

**GLYPTOCRINUS TYPUS** Miller. See *Tanaocrinus typus*.

**GLYPTOCYSTIS** Angelin. See *Cheirocrinus* Eichwald.

**GLYPTOCYSTIS** Bather (part). See *Glyptocystites* Billings.

**GLYPTOCYSTIS** LOGANI Springer. See *Cheirocrinus* logani.

**GLYPTOCYSTIS** MULTIPORUS Bather. See *Glyptocystites multiporus*.

**GLYPTOCYSTITES** Billings. Genotype: *G. multiporus* Billings.

*Glyptocystites* (part) Billings, Canadian Jour., 2, 1854, p. 215; Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 280.—Chapman, Canadian Jour., n. s., 2, 1857, p. 303.—Billings, Geol. Surv. Canada, dec. 3, 1858, p. 53.—Hall, Pal. New York, 3, 1859, p. 151.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Miller, N. A., Geol. Pal., 1889, p. 248.—Jaekel, Stammes. Pelmat. 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 275.—Grabau and Shimer (part), N. A. Index Fossils, 2, 1910, p. 463.

*Glyptocystis* Bather (part), Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 64, fig. 33; Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 430.

**GLYPTOCYSTITES** Billings (part). See *Cheirocrinus* Eichwald.

**GLYPTOCYSTITES** GRACILIS Shumard. See *Cheirocrinus* logani gracilis.

**Glyptocystites multiporus** Billings.

*Glyptocystites multipora* Billings, Canadian Jour., 2, 1854, p. 216, figs. 1-8; Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 281; *ibid.*, dec. 3, 1858, p. 54, pl. 3, fig. 1a, 1c.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Miller, N. A. Geol. Pal., 1889, p. 249, fig. 317.—Jaekel, Stammes. d. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 275, fig. 57, p. 277, pl. 15, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 463, fig. 1770.

*Callocystis multipora* Haeckel, Amphor. u. Cystoideen, 1896, p. 132, pl. 3, figs. 18-20.

*Glyptocystis multiporus* Bather, Treatise on Zool., pt. 3, Echinoderma, 1900, p. 64, fig. 33.—Springer, Mem. Geol. Surv. Canada, 15 P., 1911, p. 45 (loc. occ.).—Bather, Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 430, fig.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

**GLYPTODENDRON** Claypole. See *Cyrtoceras* Goldfuss.

**GLYPTOGRAPTUS** Lapworth. See *Diplograptus* McCoy.

**GLYPTORTHIS** Foerste. See *Hebertella* subgenus *Glyptorthis*.

**GNORIMOCRINUS** Wachsmuth and Springer.

Genotype: *Taxocrinus expansus* Angeli.

*Gnorimocrinus* Wachsmuth and Springer, Proc. Nat. Acad. Philadelphia, Rev. Pal., 1, 1879, p. 50.—Bather, Rep. British Assoc. Adv. Sci., 1899, p. 922; Lankester's Treatise on Zool., 3, 1900, p. 189.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 163.—Springer, Jour. Geol., 14, 1906, p. 515; Mono. Crin. Flex., Smiths. Inst. (in press); Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 205.

**Gnorimocrinus cirrifer** Springer.

*Gnorimocrinus cirrifer* Springer, Mono. Crin. Flex., Smiths. Inst. (in press).  
Niagaran (Brownsport): Decaturville, Tennessee.

**Gnorimocrinus varians** Springer.

*Gnorimocrinus varians* Springer, Mono. Crin. Flex., Smiths. Inst. (in press).  
Niagaran (Brownsport): Decatur County, Tennessee.



**GOLDIUS Dekoninck.**Genotype: *Brontes flabellifer* Goldfuss.

*Brontes* Goldfuss (not Fabricius), *Beit. Petrefact.*, Nova Acta Physico-Med., 19, 1839, p. 360.—Portlock, *Rep. Geol. Londonderry*, 1843, p. 268.

*Goldius Dekoninck*, *Mem. Acad. Sci. Bruxelles*, 14, 1841, p. 5.—Oehlert, *Bull. Soc. d'Etudes Sci. d'Angers*, 1885, p. 1.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 720.

*Bronteus* Goldfuss, *Neues Jahrb. f. Min., etc.*, 1843, pp. 540, 548.—Burmeister, *Org. der Tril.*, Berlin, 1843, p. 75.—Emmrich, *Neues Jahrb. f. Min., etc.*, 1845, p. 42.—Beyrich, *Ueber einige bohmische Trilobiten*, 1845, p. 33.—Hawle and Corda, *Abh. d. k. bohmischen Gesell. d. Wiss.*, 5 (extract), 1847, p. 56, pl. 4, figs. 33, 34.—Barrande, *Neues Jahrb. f. Min., etc.*, 1850, p. 777; *Syst. Sil. du Centre Boheme*, 1, 1852, p. 829.—McCoy, *British Pal. Rocks Fossils*, 1854, p. 179.—Pictet, *Traite de Pal.*, 2d ed., 2, 1854, p. 524.—Nieszkowski, *Archiv. f. Naturk. Liv-, Ebst-u. Kurl.*, 1, 1857, p. 586.—Angelin, *Pal. Scandinavica*, 3d ed., *Holmia*, 1878, p. 56.—Kayser, *Zeits. d. d. geol. Gesell.*, 31, 1879, p. 413.—Zittel, *Handb. Pal.*, 2, 1885, p. 613.—Hall and Clarke, *Pal. New York*, 7, 1888, p. 25, text fig. p. 26.—Miller, *N. A. Geol. Pal.*, 1889, p. 535.—Whidborne, *Mon. Dev. Fauna South England*, 1, *Pal. Soc.*, 1889, p. 32.—Clarke, *Geol. Minnesota*, 3, pt. 2, 1894, p. 726.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 28, fig. 18.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 104, pl. 3, fig. 21.—Clarke, 15th Ann. Rep. New York State Geol., 1898, p. 736.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 226; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 226.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 34, 1901, pp. 26, 43.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 306.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 720.

***Goldius acamas* (Hall).**

*Bronteus acamas* Hall, *Adv. Sheets*, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 28; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 322, pl. 21, figs. 19–20, p. 393; rev. ed., 1870, p. 422, pl. 21, figs. 19–20, pl. 25, fig. 21.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 2, 1907, p. 232, pl. 20, fig. 1.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 306.

*Niagaran* (Racine): Racine, Wisconsin; Bridgeport and Romeo, Illinois.

***Goldius aquilonaris* (Whiteaves).**

*Bronteus aquilonaris* Whiteaves, *Geol. Surv. Canada, Ann. Rep.*, n. s., 14, App. F, 1904, p. 58; *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 267, pl. 42, fig. 2.

*Niagaran*: Ekwan River, Canada.

***Goldius ekwanensis* (Whiteaves).**

*Bronteus ekwanensis* Whiteaves, *Geol. Surv. Canada, Ann. Rep.*, n. s., 14, App. F, 1904, p. 58; *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 266, pl. 42, fig. 1.

*Niagaran*: Ekwan River, Canada.

***Goldius flabellifer* (Goldfuss).**

*Brontes flabellifer* Goldfuss, *Nova Acta Acad. Caes. Leop. Nat.-Cur.*, 19, pt. 1, 1839, p. 361, pl. 33, fig. 3.

*Bronteus flabellifer* Philips, *Pal. Foss. Dev. and Cornw.*, 1841, p. 131, pl. 57, fig. 254.—Etheridge, *Quart. Jour. Geol. Soc. London*, 34, 1878, p. 590.

*Niagaran*: Bessels Bay, Arctic America.

***Goldius insularis* (Billings).**

*Bronteus insularis* Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 66.

*Anticostian* (Chicotte): Southwest Point, Anticosti.

**Goldius laphami** (Whitfield).

*Bronteus laphami* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 88; Geol. Surv. Wisconsin, 4, 1882, p. 310, pl. 22, figs. 1-4.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.

Niagaran (Racine): Kewaunee, Wisconsin.

**Goldius lunatus** (Billings).

*Bronteus lunatus* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 338; Geol. Canada, Geol. Surv. Canada, 1863, p. 188, fig. 187.—Miller, N. A. Geol. Pal., 1889, p. 535, fig. 980.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 725, fig. 43.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 235.—Ruedemann, Bull. New York State Mus., 49, p. 65, pl. 4, figs. 10, 11.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 198, pl. 15, figs. 14-16.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 306, fig. 1017.

Trenton: Ottawa, Canada; Wykoff, Minnesota; Lake Winnipeg; Jacksonburg, New Jersey.

**Goldius niagarensis** (Hall).

*Bronteus? niagarensis* Hall, Pal. New York, 2, 1852, p. 314, pl. 70, fig. 3.—Grabau, Bull. New York State Mus., 45, 1901, p. 226, fig. 158.

Clinton (Irondequoit—Rochester): Niagara Falls, Ontario.

**Goldius occasus** (Winchell and Marcy).

*Bronteus occasus* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 104, pl. 3, fig. 12.

Niagaran (Racine): Bridgeport, Illinois.

**GOMPHOCERAS** Sowerby.

Genotype: *Orthoceras pyrifforme* Sowerby.

*Gomphoceras* Sowerby in Murchison's Sil. Syst., 1839, p. 621.—Portlock, Rep. Geol. Londonderry, 1843, p. 381.—D'Orbigny, Prodr. de Pal., 1, 1849, pp. 3, 27.—Woodward, Man. Mollusca, pt. 1, 1851, p. 89, fig. 51 on p. 90.—Barrande, Neues Jahrb. f. Min., etc., 1854, p. 10, pl. 1, fig. 9a.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 644.—Emmons, Amer. Geology, 1, pt. 2, 1855, pp. 148, 151.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 258, pl. 3, fig. 14; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 158.—Billings, Canadian Nat. Geol., 2, 1857, p. 136, pl. 2, fig. 1.—Barrande, Neues Jahrb. f. Min., etc., 1860, p. 653; Syst. Sil. du Centre Boheme, 2, pt. 1, 1867, p. 243.—Hall, Pal. New York, 5, pt. 2, 1879, p. 318.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 5, 1880, p. 40.—Blake, Mon. British Foss. Cephalopoda, 1882, p. 58.—Zittel, Handb. Pal., 2, 1884, p. 370.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 277.—Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 470.—Miller, N. A. Geol. Pal., 1889, p. 437.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 117.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 211.—Koken, Die Leitfossilien, Leipzig, 1896, p. 47, text fig. 31.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 291.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 532; *ibid.*, 2d ed., 1913, p. 612.—Grabau, Bull. New York State Mus., 45, 1901, p. 216; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 216.—Jaekel, Zeits. d. d. geol. Gesell., 44, 1902, Protok., pp. 8, 68, 80.—Jaekel in Ruedemann, Amer. Geol., 31, 1903, p. 200.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1026.

**GOMPHOCERAS ANGUSTUM** Newell. See *Phragmoceras angustum*.

**GOMPHOCERAS CASSINENSE** Whitfield. See *Cyclostomiceras cassinense*.



**Gomphoceras cincinnatiense** Miller.

*Gomphoceras cincinnatiense* Miller, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 19, pl. 4, figs. 1, 1a.

Maysville (Corryville): Cincinnati, Ohio.

*GOMPHOCERAS CONOIDEUM* Whitfield and Hovey. See *Discosorus conoideus*.

**Gomphoceras eos** Hall and Whitfield.

*Gomphoceras eos* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 100, pl. 3, fig. 5.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 244.

Richmond: Near Dayton, Ohio.

**Gomphoceras faberi** Miller.

*Gomphoceras faberi* Miller, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 19, pl. 4, figs. 2, 2a.—James, J. F., *ibid.*, 8, 1886, p. 244.

Maysville (Corryville): Cincinnati, Ohio.

*GOMPHOCERAS HALLI* D'Orbigny. See *Orthoceras fusiforme*.

*GOMPHOCERAS HERTZERI* Miller. See *Hexameroceras hertzeri*.

**Gomphoceras indianense** Miller and Faber.

*Gomphoceras indianense* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 137, pl. 7, figs. 3-5.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1030, pl. 49, figs. 4-4b.

Richmond: Near Versailles, and Madison, Indiana.

**Gomphoceras lineare** Newell.

*Gomphoceras linearis* Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, pp. 473, 474, fig.

Niagaran: Bridges quarry, Wabash, Indiana.

*GOMPHOCERAS MARCYÆ* Winchell and Marcy. See *Gomphoceras scrinium*.

*GOMPHOCERAS MINIMUM* Whitfield. See *Cyclostomiceras minimum*.

*GOMPHOCERAS MIRUM* Barrande. See *Pentameroceras mirum*.

*GOMPHOCERAS NESTOR* Foord. See *Phragmoceras nestor*.

*GOMPHOCERAS OBESUM* Billings. See *Poterioceras obesum*.

**Gomphoceras ortonii** Foerste.

*Gomphoceras Ortoni* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 533, pl. 33, figs. 8a, b; pl. 36, figs. 7a-c.

Upper Medinan (Brassfield): Browns quarry, near Dayton, Ohio.

**Gomphoceras parvulum** Whiteaves.

*Gomphoceras parvulum* Whiteaves, Canadian Rec. Sci., 4, 1891, p. 298, pl. 3, figs. 5, 5a, b; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 296, pl. 35, figs. 2, 2a, 2b.

Niagaran: Grand Rapids of Saskatchewan, Canada.

**Gomphoceras powersi** J. F. James.

*Gomphoceras powersi* James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 255, pl. 4, fig. 2.—Ulrich, Amer. Geol., 1, 1898, p. 325.

Black River (Platteville): Beloit, Wisconsin.

**Gomphoceras projectum** Newell.

*Gomphoceras projectum* Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, pp. 476, 477, figs.

Niagaran: Delphi, Indiana.

**Gomphoceras scrinium** Hall.

*Gomphoceras scrinium* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 350, pl. 18(9), figs. 1-3; pp. 389, 393; rev. ed., 1868, 1870, p. 410, pl. 18, figs. 1-3.—Foord Cat. Foss. Ceph. British Mus., 1, 1888, p. 224.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 194, fig.

*Gomphoceras Marcyae* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 101, pl. 3, fig. 8; p. 109; p. 112.

Niagaran (Racine): Chicago, Illinois.

**GOMPHOCERAS SEPTORIS** Hall. See *Septameroceras septore*.

**Gomphoceras subgracile** Billings.

*Gomphoceras subgracile* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 311.

Silurian: Port Daniel, Gaspe, Canada.

Observation.—Possibly a species of *Septameroceras*.

**Gomphoceras wabashense** Newell.

*Gomphoceras wabashensis* Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 470-472, figs.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 476, pl. 20, figs. 3, 4.

Niagaran: Delphi and Georgetown, Indiana.

*Plesiotype*.—Cat. No. 52947, U.S.N.M.

**GOMPHOCYSTIS** Angelin. See *Gomphocystites* Hall.

**GOMPHOCYSTITES** Hall.

Genotype: *G. glans* Hall.

*Gomphocystites* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 309; rev. ed., 1870, p. 351.—Zittel, Handb. Pal., 1, 1879, p. 415.—Miller, N. A. Geol. Pal., 1889, p. 249.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 419.—Zittel, Grundzuge Pal., 1910, p. 189.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 461.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 156.

*Gomphocystis* Angelin, Icon. Crinoid, 1878, p. 31.—Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 115.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 77.

**Gomphocystites clavus** Hall.

*Gomphocystites clavus* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 310, pl. 12a (1), fig. 3; rev. ed., 1870, p. 353, pl. 12a, fig. 3.

Niagaran (Racine): Racine, Wisconsin.

**Gomphocystites glans** Hall.

*Gomphocystites glans* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, Dec. 1864), 1868, p. 310, pl. 12(3), fig. 14; pl. 12a(1), figs. 4, 5; rev. ed. 1870, p. 352, pl. 12, fig. 14; pl. 12a, figs. 4, 5.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 2a.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 421, pl. 2, figs. 8, 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 462, fig. 1768.

Niagaran (Racine): Racine, Wisconsin.

**Gomphocystites indianensis** Miller.

*Gomphocystites indianensis* Miller, N. A. Geol. Pal., 1889, p. 249, fig. 319.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 421.

Niagaran (Osgood): Jefferson County, Indiana.



**Gomphocystites tenax** Hall.

*Gomphocystites tenax* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 310, pl. 12(3), fig. 15; pl. 12a(1), figs. 1, 2; rev. ed., 1870, p. 352, pl. 12, fig. 15; pl. 12a, figs. 1, 2.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 3.—Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 115, pl. 3, fig. 37.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 421. Bather, Treatise on Zool., pt. 3, Echinoderma, London 1900, p. 77, fig. 48.

Niagaran (Lockport): Lockport, New York.

**GONAMBONITES PLANA** var. **RETROFLEXA** Verneuil. See *Clitambonites planus retroflexus*.

**Goniatis** *canadensis* Castelnau.

Not recognized.

*Goniatis canadensis* Castelnau, Syst. Sil., 1843, p. 34, pl. 11, fig. 7.

Ordovician?: Falls of Montmorency River, near Quebec, Canada.

Observation.—Probably the same as *Sinuities cancellatus*.

**GONIO CERAS** Hall.

Genotype: *G. anceps* Hall.

*Gonioceras* Hall, Pal. New York, 1, 1847, p. 54.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 2.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 638.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 678; p. 786.—Hyatt, Science, 3, 1884, p. 124.—Zittel, Handb. Pal., 2, 1884, p. 370.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 288.—Miller, N. A. Geol. Pal., 1889, p. 441.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 794.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 322.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 492.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 117.

**Gonioceras anceps** Hall.

*Gonioceras anceps* Hall, Pal. New York, 1, 1847, p. 54, pl. 14, figs. 1a-d.—Chapman, Canadian Jour., n. s., 8, 1863, p. 20, fig. 130.—Roemer, Leth. geog., 1, Leth. pal., Atlas, 1876, pl. 6, fig. 5a.—Miller, N. A. Geol. Pal., 1889, p. 441, fig. 742.—Keyes, Missouri Geol. Surv., 5, 1894, p. 220.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 117, fig. 1353.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 794, pl. 47, fig. 5.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 324, fig. 49.

*Orthoceras anceps* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 150, fig. 108a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 541, figs.

*Ormoceras anceps* Chapman, Canadian Jour., n. s., 8, 1863, p. 198, fig. 172; Expos. Min., Geol. Canada, 1864, p. 128, fig. 130; p. 170, fig. 172.

*Gonioceras hallii* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152, fig. 31; Man. Geol., 1860, p. 96, fig. 85.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 258, fig.

Black River: Watertown, etc., New York (Watertown); Ontario; Wisconsin; Minnesota; Kentucky; Tennessee.

**Gonioceras chaziense** Ruedemann.

*Gonioceras chaziense* Ruedemann, Bull. New York State Mus., 90, 1906, p. 494, pl. 36, figs. 3, 4.

Chazy (Crown Point): Near Chazy, New York.

**GONIO CERAS HALLII** Emmons. See *Gonioceras anceps*.

**GONIO CERAS LAMBI** Whiteaves. See *Tripteroceras lambi*.

**Gonioceras occidentale** Hall.

*Gonioceras occidentalis* Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 47.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 74, pl. 12, figs. 1, 2.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 795, pl. 47, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 117, fig. 1354.—Holtedahl, Vidensk. Skrifte, 1, 1912, p. 9, pl. 3, fig. 1.

Black River (Platteville): Wisconsin; Dixon, Illinois; Arctic America.

*Plesiotype*.—Cat. No. 46527, U.S.N.M.

**GONIOGRAPTUS** McCoy.

Genotype: *Didymograptus* (*Goniograptus*) *thureau* McCoy.

*Goniograptus* McCoy, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 128.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, p. 265.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 620, 621.

**Goniograptus geometricus** Ruedemann.

*Goniograptus* n. sp. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 566.

*Goniograptus geometricus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 627–630, pl. 7, figs. 5, 10–20, figs. 43–45.

Canadian (Deepkill, *Didymograptus trifidus* zone): Deepkill, Rensselaer County, New York.

Observation.—Compare *Thamnograptus anna*.

**Goniograptus perflexilis** Ruedemann.

*Goniograptus* n. sp. Ruedemann New York State Pal., Ann. Rep., 1902, p. 556.

*Goniograptus perflexilis* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 625–627, pl. 6, figs. 16–18; pl. 7, figs. 1–4, 6–9, figs. 39–42.

Canadian: Deepkill and Mount Moreno, New York (Deepkill, *Tetragraptus* and *Didymograptus* zones); Point Levis, Quebec (Levis, *Didymograptus* and *Diplograptus dentatus* zones).

**Goniograptus thureaul** (McCoy).

*Didymograptus* (*Goniograptus*) *thureau* McCoy, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, pp. 128–130.

*Graptolites* (*Didymograptus*) *thureau* McCoy, Geol. Surv. Victoria, Prodr. Pal., Victoria, dec. 5, 1877, p. 39.

*Goniograptus thureau* Ami, Geol. Surv. Canada, Rep., 2d ser., 3, pt. 2, 1889, p. 116k.—Ruedemann, Bull. New York State Mus., Pal. Ann. Rep., 1902, pp. 556, 565, 576–92, figs. 1–11; *ibid.*, Mem. 7, pt. 1, 1904, pp. 621–624, pl. 6, figs. 1–15, figs. 37, 38.

*Dichograptus* (*Clonograptus*, *Goniograptus*) *thureau* Frech, Leth. Pal., 1, Lief. 3, 1897, p. 600, fig. 165.

*Dichograptus* (*Goniograptus*) *thureau* Grabau and Shimer, N. A. Index Fossils 1, 1906, p. 29, fig. 41d, 42.

*Goniograptus thureau* var. *selwyni* Ami, Can. Rec. Sci., 3, 1889, p. 422–423, p. 502, 503, figs. 1, 2.

*Goniograptus thureau* var. *postremus* Ruedemann, Bull. New York State Mus., 52, 1902, p. 587, fig. 14.

Lower Ordovician: Sandhurst, Victoria; Point Levis, Quebec (Levis, *Clonograptus* zone); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* and *D. bifidus* zones).

**GONIOGRAPTUS THUREAU** var. **POSTREMUS** Ruedemann. See *Goniograptus thureau*.

**GONIOGRAPTUS THUREAU** var. **SELWYNI** Ami. See *Goniograptus thureau*.



**Goniophora** Phillips.Genotype: *G. cymbiformis* Sowerby.

*Goniophora* Hall, Pal. New York, 5, pt. 1, Lam., 2, 1885, p. 13.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 213.—Miller, N. A. Geol. Pal., 1889, p. 481.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 16.—Koken, Die Leitfossilien, Leipzig, 1896, p. 525.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 251.—Hind, Mon. British Carb. Lamell., 1, Pal. Soc., 1899, p. 339.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518.

**Goniophora bellula** Billings.

*Goniophora bellula* Billings, Pal. Foss. Geol. Surv. Canada, 2, pt. 1, 1874, p. 136, pl. 8, fig. 9.

Silurian: Arisaig, Nova Scotia.

**Goniophora carinata** (Hall).

*Modiolopsis carinatus* Hall, Pal. New York, 1, 1847, p. 160, pl. 35, figs. 11a-c.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 173, fig. 159.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 407, fig.

*Goniophora carinata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 504 (gen. ref.).—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 173, pl. 11, fig. 23.

*Cypricardia americana* D'Orbigny, Prodr. Pal., 1, 1850, p. 121.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 174, pl. 14, fig. 11.

Trenton: Middleville, etc., New York; New Jersey; etc.

**Goniophora consimilis** Billings.

*Goniophora consimilis* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 135, pl. 8, fig. 8.

Silurian: Arisaig, Nova Scotia.

**Goniophora crassa** Whiteaves.

*Goniophora crassa* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 9, pl. 2, figs. 3, 3a-c; *ibid.*, pt. 2, 1895, p. 67 (loc. occ.).

Niagaran (Guelph): Durham, Ontario.

**Goniophora dubia** (Hall).

*Modiolopsis? dubius* Hall, Pal. New York, 3, 1859, p. 264, pl. 49, figs. 2a-e.

*Goniophora dubia* Whitfield, Ann. New York Acad. Sci., 5, 1891, p. 514, pl. 5, figs. 24-26; Geol. Surv. Ohio, Pal., 7, 1893, p. 415, pl. 1, figs. 24-26.—Sherzer, Michigan Geol. Surv., 7, pt. 1, 1900, p. 224, pl. 17, figs. 24-26.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 519, fig. 697.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 168, pl. 30, figs. 24-26.

Cayugan (Manlius): Winfield, Herkimer County, New York.

Lower Monroan: Monroe County, Michigan; Put-in-Bay, Lake Erie.

**Goniophora medlocris** Billings.

*Goniophora medlocris* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 137, pl. 9, fig. 1.

Silurian: Arisaig, Nova Scotia.

**Goniophora speciosa** Hall.

*Goniophora speciosa* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 317, pl. 27, figs. 26, 27; Trans. Albany Inst., 10, 1883, p. 73.

Niagaran (Waldron): Waldron, Indiana.

**Goniophora transiens** Billings.

*Goniophora transiens* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 134, pl. 8, fig. 7.

Silurian (Stonehouse): Arisaig, Nova Scotia.

**GONIOPHYLLUM** Edwards and Haime.Genotype: *Turbinolia pyramidalis* Hisinger.

*Goniophyllum* Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. Mus. Hist. Nat., 5), pp. 169, 404.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 456.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 397.—Lindstrom, Geol. Mag., 3, 1866, pp. 357, 411.—Salter, Cat. Camb. Sil. Foss., 1873, p. 114.—Dybowski, Archiv. f. Natur. Liv.-Ehst-und Kurl., 5, 1873, p. 340.—Zittel, Handb. Pal., 1, 1879, p. 235.—Lindstrom, Bihang till K. Sv. Vet.-Akad. Handl., 7, 1882, p. 42.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 406.—Sherzer, Amer. Geol., 7, 1891, pp. 296–301.—Koken, Die Leitfossilien, Leipzig, 1896, p. 313.—Weller, Jour. Geol., 6, 1898, p. 700; Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 20; Zittel-Eastman Textb. Pal., 1, 1900, p. 79; *ibid.*, 2d ed., 1913, p. 87.

**Goniophyllum pyramidale** (Hisinger).

*Turbinolia turbinata* var. *pyramidalis* Hisinger, Tableau des petrif. de Suede, 1st ed., 1829, p. 22.

*Turbinolia pyramidalis* Hisinger, Tableau des petrif. de Suede, 2d ed., 1831, p. 26; Lethæa, 1838, p. 101, pl. 28, fig. 12.

*Goniophyllum pyramidale* Milne-Edwards and Haime, Polypiers fossiles, 1851, p. 404, pl. 2, figs. 4, 4a.—Lindstrom, Öfvers. Vet.-Akad. Forhandl., 1865, p. 271, pl. 30, figs. 1–9; Bihang till K. Sv. Vet.-Akad., Handl., 7, 1882, p. 43, pls. 1, 5, 6, 7, 8, 9 (see for complete bibliography).—Winchell, Amer. Geol., 6, 1890, p. 326.—Weller and Davidson, Jour. Geol., 4, 1896, p. 170, pl. 6, figs. 6–8.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 19, fig. 5.

*Cyathophyllum tetragonum* Quenstedt, Handb. der Petrefaktenkunde, Ab. 1, 6, 1879, p. 407, pl. 156, figs. 82–85.

Silurian: Island of Gotland; England; La Motte, Dubuque County, Iowa (Niagaran).

**GONIOSTROPHA** (part) Ehlert. See *Hormotoma* Salter.

**GONIOTRYPA** Ulrich.Genotype: *G. bilateralis* Ulrich.

*Goniotrypa* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 40.—Miller, N. A. Geol. Pal., 1889, p. 307.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 389.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 545.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 49.

**Goniotrypa bilateralis** Ulrich.

*Goniotrypa bilateralis* Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 41, figs. 1–3, pl. 9, fig. 1.—Miller, N. A. Geol. Pal., 1889, fig. 481 (p. 307).—Whiteaves, Pal. Foss., 3, 1895, p. 118.

Richmond: Stony Mountain, Manitoba (Stony Mountain); Island of Anticosti (Charleton).

*Cotypes*.—Cat. No. 43475, U.S.N.M.

**GONIURUS** Raymond.Genotype: *Bathyrurus perspicator* Billings.

*Goniurus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 65.

**Goniurus caudatus** (Billings).

*Bathyrurus caudatus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 261, fig. 245.

*Goniurus caudatus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 66.

Canadian: Port aux Choix, Newfoundland (Quebec—G., H.); Fort Cassin, Vermont; and Ticonderoga, New York (Beekmantown).



**Goniurus elongatus** Raymond.

*Goniurus elongatus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 66, pl. 7, figs. 11, 12.

Canadian (Beekmantown): Philipsburg and St. Armond, Missisquoi County, Quebec.

**Goniurus perspicator** (Billings).

*Bathyurus perspicator* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 205, fig. 191.

*Goniurus perspicator* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 65, pl. 7, fig. 10.

Canadian (Beekmantown): St. Antoine, above Quebec, Canada.

**GORGONIA** Hall. See *Chasmatopora* Eichwald.

**Gorgonia anticorum** Castelnau.

Not recognized.

*Gorgonia anticorum* Castelnau, Syst. Sil., 1843, p. 50, pl. 24, fig. 1.

Silurian: Lake Huron.

**GORGONIA ASPERA** Hall. See *Chasmatopora aspera*.

**GORGONIA FLABELLIFORMIS** Eichwald. See *Dictyonema flabelliforme*.

**Gorgonia infundibuliformis** Eaton.

Not recognized.

*Gorgonia infundibuliformis* Eaton, Geol. Textbook, ed. 2, 1832, p. 43, pl. 4, fig. 46.

**GORGONIA PERANTIQUA** Hall. See *Protocrisina perantiqua*.

**GORGONIA PROAVUS** Eichwald. See *Graptodictya proava*.

**GORGONIA? RETEFORMIS** Hall. See *Dictyonema retiforme*.

**Gorgonia siluriana** Castelnau.

Not recognized.

*Gorgonia siluriana* Castelnau, Syst. Sil., 1843, p. 50.

Silurian: Lake Huron.

**GOTLANDIA** Dall. See *Trimerella* Billings.

**GRAMMYSIA** Verneuil.

Genotype: *G. hamiltonensis* Verneuil.

*Grammysia* Verneuil, Bull. Geol. Soc. France (2) 4, 1847, p. 696.—Pictet, *Traite de Pal.*, 2d ed., 3, 1855, p. 530.—Barrande, *Syst. Sil. du Centre Boheme*, 6, 1881, p. 85; *Acephales: Ext. Syst. Sil. du Centre Boheme*, 1881, p. 135.—Zittel, *Handb. Pal.*, 2, 1881, p. 128.—Hall, *Pal. New York*, 5, pt. 1, Lam. 2, 1885, p. 30.—Miller, *N. A. Geol. Pal.*, 1889, p. 482.—Nettelroth, *Kentucky Foss. Shells*, Geol. Surv. Kentucky, 1889, p. 207.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 525.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1899, p. 260.—Dall, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 439.

**Grammysia acadica** Billings.

*Grammysia Acadica* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 140, pl. 9, fig. 4, 4a.

Silurian (Moydart, Stonehouse): Arisaig, Nova Scotia.

**Grammysia? aretica** Bassler (new name).

*Grammysia? triangulata* Hortedahl (not Williams, 1913), 2d Arct. Exp. Fram, 1898-1902, No. 32, 1914, p. 28, pl. 8, fig. 8.

Helderbergian (Lower beds): Southwestern Ellesmereland, Arctic America.

**GRAMMYSIA CASWELLI** Foerste. See *Cuneamya? caswelli*.

**GRAMMYSIA CINGULATA TRIANGULATA** McCoy. See *Grammysia triangulata*.

*GRAMMYSIA NEGLECTA* Hall and Whitfield. See *Cuneamya neglecta*.

***Grammysia pembrokensis* Williams.**

*Grammysia pembrokensis* Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 344, pl. 31, fig. 2.

Silurian (Pembroke): Pembroke, Washington County, Maine.

*Holotype*.—Cat. No. 58968, U.S.N.M.

***Grammysia remota* Billings.**

*Grammysia remota* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 50, 1874, p. 139, pl. 9, fig. 2.

Silurian: Arisaig, Nova Scotia.

***Grammysia rustica* Billings.**

*Grammysia rustica* Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 139, pl. 9, fig. 3.

Silurian (Stonehouse): Arisaig, Nova Scotia.

***Grammysia triangulata* (Salter).**

*Orthonota triangulata* Salter, Mem. Geol. Surv. Great Britain, 1848, 2, pt. 1, Pal. app., p. 361, pl. 18, fig. 7.

*Grammysia cingulata* var. *triangulata* McCoy, British Pal. Foss., 1855, p. 280, pl. 1k, fig. 28.

*Grammysia triangulata* Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 345, pl. 31, fig. 17.

Silurian: Great Britain; Long Cove, Washington County, Maine (Pembroke).

*Plesiotype*.—Cat. No. 58970, U.S.N.M.

*GRAMMYSIA?* *TRIANGULATA* Hortedahl. See *Grammysia arctica*.

***GRAPTODICTYA* Ulrich.**

Genotype: *Ptilodictya perelegans* Ulrich.

*Graptodictya* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 151, 165.—

Miller, N. A. Geol. Pal., 1889, p. 307.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 393.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 14.—Simpson, 14th Ann. Rep. New York State Geol. for 1894, 1897, p. 541.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 747.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 121.

*GRAPTODICTYA NITIDA* Ulrich. See *Graptodictya perelegans*.

***Graptodictya perelegans* (Ulrich).**

*Ptilodictya perelegans* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 94, pl. 4, figs. 16, 16a.

*Graptodictya perelegans* Ulrich, *ibid.*, 5, 1882, p. 165, pl. 8, fig. 5.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 122, fig., p. 121.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 280.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 836, pl. 29, fig. 8.

*Graptodictya nitida* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, p. 166, pl. 7, figs. 8, 8a.

Richmond (Waynesville, Liberty): Clarkesville, etc., Ohio; Indiana.

*Holotypes*.—Cat. Nos. 43274, 43661, U.S.N.M.

***Graptodictya proava* (Eichwald).**

*Gorgonia proavus* Eichwald, Urwelt Russlands, 2, 1840, p. 44, pl. 1, fig. 5.

*Coscium proavus* Eichwald, Leth. Rossica, 1, 1860, p. 398.

*Coscium proavium* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 158, fig. 122.



**Graptodictya proava**—Continued.

*Graptodictya proava* Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 123-126, figs. 49, 50; pl. 8, fig. 2; pl. 9, figs. 1-6.

*Clathropora flabellata* Hall, Foster and Whitney's Rep. Geol. Lake Superior Land Dist., pt. 2, 1851, p. 207, pl. 24, figs. 2a, b.

*Stictoporella flabellata* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 416.

*Stictoporella cribrosa* Sardeson (not Ulrich), Jour. Geol., 9, 1901, p. 157, pl. B, figs. 7-9.

Middle Ordovician: Uxnorm, Esthonia, Russia (Wassalein); Kenyon, Minnesota, and Escanaba River, Michigan (Trenton).

*Plesiotype*.—Cat. No. 57216, U.S.N.M.

**GRAPTOLITES (DIDYMOGRAPSUS) BRYONOIDES** McCoy. See *Tetragraptus serra*.

**GRAPTOLITES (DIDYMOGRAPSUS) CADUCEUS** McCoy. See *Didymograptus (Isograptus) caduceus*.

**GRAPTOLITES DENTATUS** Vanuxem. See *Glossograptus (Orthograptus) quadrimucronatus*.

**GRAPTOLITES (DIDYMOGRAPTUS) EXTENSUS** McCoy. See *Didymograptus extensus*.

**GRAPTOLITES (DIDYMOGRAPTUS) FRUTICOSUS** McCoy. See *Tetragraptus fruticosus*.

**GRAPTOLITES (DIDYMOGRAPTUS) LOGANI** McCoy. See *Loganograptus logani*.

**GRAPTOLITES NILSSONI** Harkness. See *Monograptus gregarius*.

**GRAPTOLITES (DIDYMOGRAPTUS) OCTOBRACHIATUS** McCoy. See *Dichograptus octobrachiatus*.

**GRAPTOLITES PRIODON** of authors. See *Monograptus priodon*.

**GRAPTOLITES PRISTIS** (part) of authors. See *Diplograptus foliaceus*.

**GRAPTOLITES (DIDYMOGRAPSUS) QUADRIBRACHIATUS** McCoy. See *Tetragraptus quadribrachiatum*.

**GRAPTOLITES (DIDYMOGRAPTUS) THUREAU** McCoy. See *Goniograptus thureau*.

**GRAPTOLITES VENOSUS** Hall. See *Retiolites geinitzianus venosus*.

**GRAPTOLITHUS ABNORMIS** Hall. See *Clonograptus abnormis*.

**GRAPTOLITHUS ACUTUS** Hopkinson. See *Monograptus intermedius*.

**GRAPTOLITHUS ALATUS** Hall. See *Tetragraptus alatus*.

**GRAPTOLITHUS AMPLEXICAULE** Hall. See *Diplograptus (Glyptograptus) amplexicaule*.

**GRAPTOLITHUS ANGUSTIFOLIUS** Hall. See *Diplograptus (Glyptograptus) angustifolius*.

**GRAPTOLITHUS ANNECTANS** Walcott. See *Leptograptus annectans*.

**GRAPTOLITHUS ARCUATUS** Hall. See *Didymograptus arcuatus*.

**GRAPTOLITHUS ARUNDINACEUS** Hall. See *Mastigograptus arundinaceus*.

**GRAPTOLITHUS BICORNIS** Hall. See *Climacograptus bicornis*.

**GRAPTOLITHUS BIFIDUS** Hall. See *Didymograptus bifidus*.

- GRAPTOLITHUS BIGSBYI Hall. See *Tetragraptus similis*.
- GRAPTOLITHUS BRYONOIDES Hall. See *Tetragraptus amii* and *T. serra*.
- GRAPTOLITHUS CADUCEUS Chapman. See *Didymograptus (Isograptus) caduceus*.
- GRAPTOLITHUS CLINTONENSIS Hall. See *Monograptus clintonensis*.
- GRAPTOLITHUS CONSTRICTUS Hall (part). See *Didymograptus extensus* and *D. hirundo*.
- GRAPTOLITHUS CONVOLUTUS Carruthers. See *Monograptus convolutus*.
- GRAPTOLITHUS CRUCIFER Hall. See *Tetragraptus crucifer*.
- GRAPTOLITHUS DENTATUS D'Orbigny. See *Diplograptus foliaceus*.
- GRAPTOLITHUS DENTICULATUS Hall. See *Tetragraptus denticulatus*.
- GRAPTOLITHUS DIVARICATUS Hall. See *Dicellograptus divaricatus*.
- GRAPTOLITHUS DIVERGENS Hall. See *Amphigraptus divergens*.
- GRAPTOLITHUS ENSIFORMIS Hall. See *Trigonograptus ensiformis*.
- GRAPTOLITHUS EXTENSUS Hall. See *Didymograptus extensus*.
- GRAPTOLITHUS EXTENUATUS Hall. See *Didymograptus extenuatus*.
- GRAPTOLITHUS FLACCIDUS Hall. See *Leptograptus flaccidus*.
- GRAPTOLITHUS FLEMINGII Salter. See *Monograptus flemingii*.
- GRAPTOLITHUS (DICHOGRAPTUS) FLEXILIS Hall. See *Clonograptus flexilis*.
- GRAPTOLITHUS FOLIACEUS Murchison. See *Diplograptus foliaceus*.
- GRAPTOLITHUS FOLIUM Salter. See *Diplograptus foliaceus*.
- GRAPTOLITHUS FRUTICOSUS Hall. See *Tetragraptus fruticosus*.
- GRAPTOLITHUS FURCATUS Hall. See *Dicranograptus furcatus*.
- GRAPTOLITHUS GRACILIS Hall. See *Nemagraptus gracilis* and *N. gracilis surcularis*.
- GRAPTOLITHUS HEADI Hall. See *Tetragraptus headi*.
- GRAPTOLITHUS (DIPLOGRAPTUS) HYPNIFORMIS White. See *Diplograptus foliaceus*.
- GRAPTOLITHUS INDENTUS Hall. See *Didymograptus indentus*.
- GRAPTOLITHUS INTERMEDIUS Carruthers. See *Monograptus intermedius*.
- GRAPTOLITHUS LAEVIS Hall. See *Phycograptus laevis*.
- GRAPTOLITHUS LOGANI Hall. See *Loganograptus logani*.
- GRAPTOLITHUS MARCIDUS Hall. See *Cryptograptus tricornis*.
- GRAPTOLITHUS MILESI Hall. See *Clonograptus milesi*.
- GRAPTOLITHUS MUCRONATUS Hall. See *Lasiograptus mucronatus*.
- GRAPTOLITHUS MULTIFASCIATUS Hall. See *Amphigraptus multifasciatus*.
- GRAPTOLITHUS MULTIFASCICULATUS Lesley. See *Amphigraptus multifasciatus*.
- GRAPTOLITHUS NITIDUS Hall. See *Didymograptus nitidus*.



- GRAPTOLITHUS OCTOBRACHIATUS Hall. See *Dichograptus octobrachiatus*.
- GRAPTOLITHUS OCTONARIUS Hall. See *Dichograptus octonarius*.
- GRAPTOLITHUS PATULUS Hall. See *Didymograptus patulus*.
- GRAPTOLITHUS PENNATULUS Hall. See *Didymograptus pennatulus*.
- GRAPTOLITHUS (DIPLOGRAPTUS) PEOSTA Hall. See *Diplograptus peosta*.
- GRAPTOLITHUS PRIODON Barrande. See *Monograptus priodon*.
- GRAPTOLITHUS PRIODON Chapman. See *Monograptus clintonensis*.
- GRAPTOLITHUS PRISTINIFORMIS Hall. See *Diplograptus dentatus*.
- GRAPTOLITHUS PRISTIS Hall (part). See *Diplograptus foliaceus*, *D. foliaceus acutus*, *D. foliaceus incisus*, *Glossograptus* (*Orthograptus*) *quadrimucronatus*, and *Diplograptus peosta*.
- GRAPTOLITHUS PUTILLUS Hall. See *Climacograptus* (*Mesograptus*) *putillus*.
- GRAPTOLITHUS QUADRIBRACHIATUS Hall. See *Tetragraptus quadribrachiatus*.
- GRAPTOLITHUS QUADRIMUCRONATUS Hall. See *Glossograptus* (*Orthograptus*) *quadrimucronatus*.
- GRAPTOLITHUS RAMOSUS Salter. See *Dicranograptus rectus*.
- GRAPTOLITHUS (DIPLOGRAPTUS) RAMOSUS Chapman. See *Dicranograptus ramosus*.
- GRAPTOLITHUS RAMULUS Hall. See *Temnograptus?* *ramulus*.
- GRAPTOLITHUS (CLIMACOGRAPTUS) RAMULUS White. See *Dicranograptus nicholsoni whitianus*.
- GRAPTOLITHUS RICHARDSONI Hall. See *Holograptus?* *richardsoni*.
- GRAPTOLITHUS RIGIDUS Hall. See *Clonograptus rigidus*.
- GRAPTOLITHUS SAGITTARIUS Hisinger. See *Didymograptus sagitticaulis*.
- GRAPTOLITHUS (PRIONODUS) SEDGWICKII DISTANS. See *Monograptus distans*.
- GRAPTOLITHUS (MONOPRION) SERRATULUS Hall. See *Didymograptus serratulus*.
- GRAPTOLITHUS SEXTANS Hall. See *Dicellograptus sextans* and *D. sextans exilis*.
- GRAPTOLITHUS SIMILIS Hall. See *Didymograptus similis*.
- GRAPTOLITHUS SPINULOSUS Lapworth. See *Glossograptus ciliatus*.
- GRAPTOLITHUS SUBTENUIS Hall. See *Didymograptus subtenuis*.
- GRAPTOLITHUS TENTACULATUS Hall. See *Retiograptus tentaculatus*.
- GRAPTOLITHUS TENUIS Portlock (part). See *Leptograptus annectans* and *Didymograptus subtenuis*.
- GRAPTOLITHUS WHITFIELDI Hall. See *Glossograptus whitfieldi* and *Lasiograptus bimucronatus*.
- GRAPTOLITHUS WHITIANUS Miller. See *Dicranograptus nicholsoni whitianus*.
- GRAPTOPORA SOCIALIS Salter. See *Dictyonema flabelliforme*.

**GRAPTOSPONGIA** Ruedemann. Genotype: *G. pusilla* Ruedemann.  
*Graptospongia* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485.

**Graptospongia pusilla** Ruedemann.

*Graptospongia pusilla* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485, figs. 467, 468.

Chazyan (Normanskill): Schuylerville, Saratoga County, New York.

**GREENFIELDIA** Grabau. See *Hindella* subgenus *Greenfieldia*.

**GYPIDIA** UNGUIFORMIS Ulrich. See *Conchidium unguiforme*.

**GYPIDULA** Dalman. See *Conchidium Linnæus*.

**GYPIDULA** Hall. Genotype: *Pentamerus occidentalis* Hall.

*Gypidula* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 163; Pal. New York, 4, 1867, pp. 373, 380.—Zittel, Handb. Pal., 1, 1880, p. 694.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 161.—Miller, N. A. Geol. Pal., 1889, p. 346.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 322.

*Sieberella* Ehlert, Fischer's Man. Conch., 1887, p. 1311.

*Gypidula* and *Sieberella* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 245; 13th Ann. Rep. New York State Geol., 1895, pp. 845, 846.

**Gypidula (Sieberella) coeymanensis corriganensis** Maynard.

*Gypidula (Sieberella) coeymanensis* var. *corriganensis* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 345, pl. 62, figs. 12-18.

Helderbergian (Keyser): Devils Backbone, near Cumberland, Maryland; Keyser, West Virginia.

**Gypidula (Sieberella) coeymanensis prognostica** Maynard.

*Gypidula (Sieberella) coeymanensis* var. *prognostica* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 344, pl. 62, figs. 9-11.—Holtedahl, Second Arct. Exped. "Fram," 1898-1902, No. 32, 1914, p. 21, pl. 7, fig. 5.

Helderbergian (Keyser): Pinto, Cumberland, Hancock, etc., Maryland; Keyser, West Virginia; Hyndman, Pennsylvania; Southwestern Ellesmereland, Arctic America.

**Gypidula coppingeri** (Etheridge).

*Pentamerus coppingeri* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 594, pl. 25, figs. 2, 3.

*Gypidula coppingeri* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran: Offley Island, Arctic America.

**Gypidula (Sieberella) galeata** (Dalman).

*Atrypa galeata* Dalman, Kongl. Svenska, Vet.-Akad. Handl., för 1827, 1828, p. 46, pl. 5, fig. 4.—Troost, 6th Geol. Rep. Tennessee, 1841, p. 15.—Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 117, fig. 1.—Castelnau, Essai Syst. Sil. l'Amérique Septentrionale, 1843, p. 39, pl. 14, fig. 4.

*Pentamerus galeatus* Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 105, figs. 1-3.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 825, fig. 646.—Hall, Pal. New York, 3, 1859, p. 257, pl. 46, fig. 1; pl. 47, fig. 1.—Billings, Geol. Canada, 1863, p. 957, fig. 454.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 616, fig.—Sherzer, Michigan Geol. Surv., 7, 1900, pt. 1, p. 224.

*Pentamerus galeatus* var. *Whiteaves*, Cont. to Canadian Pal., 1, 1891, p. 234.

*Sieberella galeatus* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 246, fig. 175; pl. 72, figs. 7-13.



**Gypidula (Sieberella) galeata**—Continued.

*Gypidula (Sieberella) galeatus* Kindle and Breger, 28th Ann. Rep. Dep., Geol. Nat. Res. Indiana, 1904, p. 437, pl. 2, figs. 20, 21, 23–29.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 278, fig. 388.

Devonian: Europe; New York; Maryland; Pennsylvania; New Brunswick; etc. Identified in Niagaran at Delphi, Indiana, and in the Monroan of Michigan, both probably erroneously.

**Gypidula globulosa** (Nettelroth).

*Pentamerus globulosus* Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 54.

*Gypidula globulosa* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

*Cotypes*.—Cat. No. 51339, U.S.N.M.

**Gypidula knotti** (Nettelroth).

*Pentamerus knotti* Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 56, pl. 32, figs. 9–12.

*Gypidula knotti* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

*Holotype*.—Cat. No. 51354, U.S.N.M.

**Gypidula (Sieberella) nucleus** (Hall and Whitfield).

*Pentamerus galeatus* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, pp. 197, 200a.

*Pentamerus nucleus* Hall and Whitfield, 27th Rep. New York State Cab. Nat. Hist., 1875, pl. 9, figs. 30–32.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 59, pl. 27, figs. 25–27; pl. 33, figs. 27–33.

*Sieberella nucleus* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247, pl. 72, figs. 1–3.

*Gypidula nucleus* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

*Gypidula (Sieberella) nucleus*, Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 438, pl. 2, figs. 18, 19.

Niagaran: Louisville, Kentucky (Louisville); Georgetown, Indiana.

*Plesiotypes*.—Cat. No. 51328, U.S.N.M.

**Gypidula (Sieberella) roemeri** (Hall and Clarke).

*Pentamerus galeatus* Roemer (not Dalman), Sil. Fauna West. Tennessee, 1860, p. 73, pl. 5, fig. 14.

*Sieberella roemeri* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247, pl. 72, fig. 6; 48th Rep. New York State Mus., 2, 1897, p. 370, pl. 13, fig. 4; 14th Rep. State Geol. New York for 1894, 1897, p. 370, pl. 13, fig. 4.

*Gypidula roemeri* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 227.—Foerste, Jour. Geol., 11, 1903, p. 711 (loc. occ.); Bull. Sci. Lab. Denison Univ., 14, 1909, p. 70, pl. 3, fig. 51C.

Niagaran: Decatur County, Tennessee (Brownsport); ?Newsom, Tennessee (Waldron).

**Gypidula simplex** Foerste.

*Gypidula simplex* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 70, pl. 3, figs. 51A, B.

Niagaran (Waldron): Newsom, Tennessee.

**Gypidula subglobosa** Maynard.

*Gypidula subglobosa* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 346, pl. 62, figs. 20–22.

Helderbergian (Keyser): Cash Valley, near Cumberland, Maryland.

**Gypidula (Sieberella) uniplicata** (Nettelroth).

*Pentamerus uniplicatus* Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 63, pl. 33, figs. 25, 26.

*Sieberella uniplicata* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247.

*Gypidula uniplicata* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

*Holotype*.—Cat. No. 51337, U.S.N.M.

**GYROCERAS** Dekoninck.

Genotype: *G. paradoxicum* Dekoninck.

*Gyroceras* Dekoninck, Desc. Animaux Fossiles, Liege, 1842, p. 530.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 27.—Woodward, Man. Mollusca, pt. 1, 1851, p. 91, fig. 52.—Saemann, Palaeontographica, 3, 1852, pp. 139, 159.—Barrande, Neues Jahrb. f. Min., 1854, etc., p. 7, pl. 1, figs. 4a, b.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 651.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 259; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 159, pl. 5, fig. 7.—Billings, Canadian Nat. Geol., 2, 1857, p. 136, pl. 2, fig. 5.—Chapman, Canadian Jour., n. s., 2, 1857, p. 266.—Salter, Geol. Surv. Canada, dec. 1, 1859, pp. 31, 32.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 1, 1867, p. 156.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th Ser., I, 1879, p. 64.—Hall, Pal. New York, 5, pt. 2, 1879, pp. 358, 368, 389.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 5, 1880, p. 1.—Blake, Mon. British Foss. Ceph., 1882, p. 65.—Zittel, Handb. Pal., 2, 1884, p. 376.—Miller, N. A. Geol. Pal., 1889, p. 441.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 90.—Foord, Cat. Foss. Ceph. British Mus., 2, 1891, p. 53.—Koken, Die Leitfossilien, Leipzig, 1896, p. 50, fig. 34.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1027.

**Gyroceras abruptum** Hall.

*Gyroceras abruptum* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 325; Trans. Albany Inst., 10, 1883, p. 75

Niagaran (Waldron): Waldron, Indiana.

**Gyroceras americanum** Billings.

*Gyroceras* (*Lituites*) *americanum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 309.

*Trochoceras americanum*? Foord, Cat. Foss. Ceph. British Mus., 2, 1891, p. 40.

Silurian: Port Daniel, Gaspe, Canada.

**Gyroceras baeri** (Meek and Worthen).

*Trochoceras*? *Baeri* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 263.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 157, pl. 13, fig. 9.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 133.

*Lituites baeri* James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 248.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1228, figs.

*Gyroceras baeri* Miller, N. A. Geol. Pal., 1889, p. 441 (gen. ref.).—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 1032, pl. 51, fig. 1.

Richmond (Liberty): Richmond, etc., Indiana; Warren and Clinton Counties, Ohio.

**Gyroceras bannisteri** Winchell and Marcy.

*Gyroceras bannisteri* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 102.

*Trochoceras* (*Gyroceras*) *bannisteri* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pp. 261, 393; rev. ed., 1870, p. 403, pl. 25, fig. 17.

Niagaran (Racine): Chicago, Illinois; Wisconsin.



**Gyroceras duplicostatum** Whitfield.

*Gyroceras duplicostatum* Whitfield, *Ann. Rep. Geol. Surv. Wisconsin* for 1877, 1878, p. 78; *Geol. Wisconsin*, 4, 1882, p. 235, pl. 7, fig. 1.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 159, fig.—Clarke, *Geol. Minnesota*, 3, pt. 2, 1897, p. 811. Black River (Platteville): Beloit, Janesville, etc., Wisconsin.

**Gyroceras elrodi** White.

*Gyroceras elrodi* White, 11th *Ann. Rep. Indiana Dep. Geol. Nat. Hist.*, 1882, p. 356, pl. 37, fig. 1; pl. 38, figs. 2-4.—Lesley, *Geol. Surv. Pennsylvania*, *Rep.* P 4, 1889, p. 268, figs.

*Barrandeoceras elrodi* Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 771 (gen. ref.). Niagaran (Laurel): Hartsville, Indiana.

**Gyroceras farcimen** Clarke and Ruedemann.

*Gyroceras farcimen* Clarke and Ruedemann, *Mem. New York State Mus.*, 5, 1903, p. 92, pl. 18, figs. 1-4.

Niagaran (Guelph): Shelby, New York.

**GYROCERAS HERCULES** Chamberlin. See *Protophragmoceras hercules*.

**GYROCERAS (LITUITES) MAGNIFICUM** Billings. See *Apsidoceras magnificum*.

**GYROCERAS PARADOXICUM** Hall. See *Orthoceras paradoxicum*.

*Gyroceras rhombolineare* Owen.

Not recognized.

*Gyroceras rhombolinearis* Owen, *Geol. Surv. Indiana*, 1862, p. 362, fig. 4.

Silurian: Locality not given.

**GYROCERAS (LITUITES) VAGRANS** Billings. See *Barrandeoceras vagrans*.

**GYRONEMA** Ulrich.

Genotype: *G. pulchellum* Ulrich and Scofield.

*Gyronema* (subgenus of *Trochonema*) Ulrich, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1054.—Koken, *Neues Jahrb. f. Min., Geol. Pal.*, 1, 1898, p. 24.

**Gyronema brevispira** Whiteaves.

*Gyronema brevispira* Whiteaves, *Geol. Surv. Canada, Ann. Rep.*, n. s., 14, 1904, App. F, p. 51; *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 259, pl. 29, fig. 4.

Niagaran: Ekwan River, Canada.

**Gyronema dowlngi** Whiteaves.

*Gyronema Dowlngii* Whiteaves, *Geol. Surv. Canada, Ann. Rep.*, n. s., 14, App. F, 1904, p. 50; *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 259, pl. 29, fig. 3.

Niagaran: Ekwan River, Canada.

**Gyronema duplicatum** Ulrich and Scofield.

*Gyronema duplicatum* Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1055, pl. 78, figs. 22-25.

*Trochonema* (*Gyronema*) *duplicatum* Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 671, fig. 928g, h.

Black River (Platteville): Beloit, etc., Wisconsin; Dixon, Illinois.

*Cotype*.—Cat. No. 45823, U.S.N.M.

**Gyronema historicum** (Hudson).

*Eunema historicum* Hudson, *Bull. New York State Mus.*, 80, 1905, p. 288, pl. 4, fig. 5.

*Gyronema historicum* Raymond, *Ann. Carnegie Mus.*, 4, 1908, p. 208, pl. 54, figs. 5, 6.

*Cyclonema?* *normaliana* Raymond, *Amer. Jour. Sci.*, 4th Ser., 20, 1905, p. 377.

Chazy (Valcour): Valcour Island and Plattsburg, New York.

**Gyronema leptonotum** (Raymond).

*Eunema leptonotum* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 378.

*Gyronema leptonotum* Raymond, Ann. Carnegie Mus., 4, 1908, p. 209, pl. 55, fig. 15.

Chazyan (Day Point): Chazy, New York.

**Gyronema liratum** Ulrich and Scofield.

*Gyronema liratum* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1056, pl. 78, fig. 14-16.

*Trochonema* (*Gyronema*) *liratum* Grabau, Amer. Nat., 36, 1902, p. 925.

Black River (Platteville): Beloit, Wisconsin.

*Holotype*.—Cat. No. 45824, U.S.N.M.

**Gyronema microclathratum** (Hudson).

*Holopea microclathrata* Hudson, Bull. New York State Mus., 80, 1905, p. 294, pl. 4, figs. 3, 4.

*Gyronema microclathratum* Raymond, Ann. Carnegie Mus., 4, 1908, p. 210.

Chazyan (Valcour): Valcour Island, New York.

**Gyronema percarinatum** (Hall).

*Pleurotomaria percarinata* Hall, Pal. New York, 1, 1847, p. 177, pl. 38, fig. 4; 12th Rept. New York State Cab. Nat. Hist., 1855, p. 74.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 160, pl. 5, fig. 7.

*Cyclonema percarinata* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 321.—Whitfield, Geol. Wisconsin, 4, 1882, p. 211, pl. 5, fig. 15.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 172, fig.

Trenton: Middleville, New York.

**Gyronema pulchellum** Ulrich and Scofield.

*Gyronema pulchellum* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1054, pl. 78, figs 19-21.

*Trochonema* (*Gyronema*) *pulchellum* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 671, fig. 928e, f.

Black River: Minneapolis, Chatfield, etc., Minnesota (Decorah); Mercer County, Kentucky.

*Cotypes*.—Cat. No. 45825, U.S.N.M.

**Gyronema? rotalineum** Raymond.

*Gyronema? rotalineum* Raymond, Ann. Carnegie Mus., 3, 1906, p. 577; *ibid.*, 4, 1908, p. 210, pl. 54, fig. 4.

Chazyan (Crown Point): Sloop Bay, Valcour Island, New York.

**Gyronema semicarlinatum** (Salter).

*Cyclonema semicarinata* Salter, Geol. Surv. Canada, Can. Org. Rem., dec. 1, 1859, p. 27, pl. 6, figs. 2, 2a (not 2b).—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 145, fig. 90.—Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 343.

*Gyronema semicarlinatum* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1055, pl. 78, figs. 17, 18.

Black River: Allumette Island, Ottawa River, Canada (Leray); near Cannon Falls, Minnesota (Decorah).

*Plesiotypes*.—Cat. No. 45826, U.S.N.M.



**Gyronema speciosum** Whiteaves.

*Gyronema speciosum* Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 50; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 258, pl. 29, fig. 2.

Niagaran: Ekwan River, Canada.

**HABROCRINUS** D'Orbigny.

Genotype: *H. pusillus* D'Orbigny.

*Abrocrinus* D'Orbigny, Prodrôme Pal. Strat., 1, 1844, pp. 47-146; Cours Élémentaire de Pal., Geol., 2, 1851, p. 144.

*Habrocrinus* Angelin, Icon. Crin. Suec., 1878, p. 3.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 279 (Rev. Pal., pt. 2, p. 105).

**Habrocrinus benedicti** (Miller).

*Saccocrinus benedicti* Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 283, pl. 5, fig. 1, 2 (adv. sheets, 1892).

*Habrocrinus benedicti* Slocum, Field Columbian Mus., 2, Geol. Ser., 1908, p. 295, pl. 87, figs. 6, 7.

*Periechocrinus chicaoensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1902, p. 131, pl. 13, figs. 7, 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 536.

Niagaran: St. Paul, Indiana (Laurel); Bridgeport and Joliet, Illinois (Racine).

**Habrocrinus farringtoni** Slocum.

*Habrocrinus farringtoni* Slocum, Field Columbian Mus. Geol., 2d ser., 2, 1908, p. 298, pl. 87, figs. 1-5.

Niagaran (Racine): Drainage Canal near Lemont, Illinois.

**Habrocrinus howardi** (Miller).

*Saccocrinus howardi* Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 284, pl. 5, fig. 3-5 (adv. sheets, 1892); N. A. Geol. Pal., 1st App., 1892, p. 681, fig. 1244.

*Periechocrinus Howardi* Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 529.

*Habrocrinus howardi* Slocum, Field Columbian Mus., 2, Geol. Ser., 1908, p. 295.

Niagaran (Laurel): St. Paul, Indiana.

**Habrocrinus lemontensis** Slocum.

*Habrocrinus lemontensis* Slocum, Field Columbian Mus., Geol. Ser., 2, 1908, p. 297, pl. 87, figs. 8-10.

Niagaran (Racine): Drainage Canal near Lemont, Illinois.

**HABROCRINUS ORNATUS** Wachsmuth and Springer. See *Periechocrinus ornatus*.

**HALICHONDRITES** Dawson and Hinde.

Genotype: *H. confusus* Dawson and Hinde.

*Halichondrites* Dawson and Hinde, Canadian Rec. Sci., 3, 1888, p. 68.—Dawson, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 52.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 667.—Rauff, Neues Jahrb. Min., Geol. Pal., 2, 1893, p. 58.

**Halichondrites confusus** Dawson and Hinde.

*Halichondrites confusus* Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 52, fig. 23.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 116, fig. 26.

Canadian? (Levis?): Metis, Quebec.

**HALLIA** Edwards and Haime.

Genotype: *H. insignis* Edwards and Haime.

*Hallia* Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 165-353.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 453.—

**HALLIA**—Continued.

Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 356.—Ludwig, Palæontographica, 14, 1865, p. 143, pl. 31, fig. 5.—Lindstrom, Geol. Mag., 3, 1866, p. 412.—Dybowski, Archiv. f. Naturf. Liv-, Ebst-und Kurl, 5, 1873, p. 337.—Zittel, Handb. Pal., 1, 1879, p. 230.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 411 (Ext., 1882, p. 7).—Frech, Zeits. d. Deutschen geol. Gesell., 37, 1885, p. 81; Pal. Anhandl., Dames and Kayser, 3, Heft 3, 1886, p. 81.—Miller, N. A. Geol. Pal., 1889, p. 191.—Sherzer, Amer. Geol., 7, 1891, pp. 290-295.—Koken, Die Leitfossilien, Leipzig, 1896, p. 472.

**Hallia divergens** Hall.

Hallia divergens Hall, 35th Rep. New York State Mus. Nat. Hist., 1884 p. 412 (Ext., 1882, p. 8).

Niagaran (Racine): Racine, Wisconsin.

**Hallia divisa** Hall.

Hallia divisa Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 412 (Ext., 1882, p. 8).

Niagaran: Louisville, Kentucky.

**Hallia pluma** Hall.

Hallia pluma Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 412 (Ext., 1882, p. 8).

Niagaran (Racine): Racine, Wisconsin.

**Hallia scitula** Hall.

Hallia scitula Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 411 (Ext., 1882, p. 7).

Niagaran: Louisville, Kentucky.

**HALLICYSTIS** Jaekel.

Genotype: *Apiocystites imago* Hall.

*Apiocystites* Hall (not Forbes nor Hall, 1852), 20th Rep. New York State Cab. Nat. Hist., rev. ed., 1868, p. 358.

*Hallicystis* Jaekel, Stammes. Pemat., Berlin, 1, 1899, p. 287.—Schuchert, Smith. Misc. Coll., 47, pt. 2, 1904, p. 216.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 154.

**Hallicystis elongatus** (Jaekel).

*Hallicystis elongata* Jaekel, Stammesg. d. Pemat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 288.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 217.

Niagaran (Racine): Near Chicago, Illinois.

**Hallicystis imago** (Hall).

*Apiocystites imago* Hall, 18th Rep. New York State Cab. Nat. Hist., 1864, p. 10, pl. 3, fig. 12; pl. 1, fig. 9; 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 314, pl. 12 (3), fig. 12; pl. 12a (1) fig. 9; rev. ed., 1870, p. 358, pl. 12, fig. 12; pl. 12a, fig. 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.

*Hallicystis imago* Jaekel, Stammes. Pemat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 288, pl. 15, fig. 3.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 216, fig. 24.

Niagaran (Racine): Racine, Wisconsin; Chicago, Illinois.

*Plesiotypa*.—Cat. No. 35060, U.S.N.M.

**HALLIELLA** Ulrich.

Genotype: *H. sculptilis* Ulrich.

*Halliella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 2, 1891, p. 184.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 707.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 656.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 346.



**Halliella labiosa** Ulrich.

- Halliella labiosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 656, pl. 46, figs. 43-46.—  
Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 346, fig. 1658r, r'.—  
Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425h.  
Trenton (Prosser): Near Cannon Falls, Minnesota.  
*Cotypes*.—Cat. No. 41361, U.S.N.M.

**Halliella sculptilis** (Ulrich).

- Primitia?* *sculptilis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 136, pl. 8, fig. 6.  
*Halliella sculptilis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 656.  
Trenton (Perryville): Perryville, Boyle County, Kentucky.  
*Holotype*.—Cat. No. 41362, U.S.N.M.

**Halliella? seminulum longa** Ulrich and Bassler.

- Halliella? seminulum* var. *longa* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 520, pl. 95, fig. 16.  
Helderbergian (Keyser): Cumberland, Maryland.  
*Holotype*.—Cat. No. 53309, U.S.N.M.

**Halliella? triplicata** Ulrich and Bassler.

- Halliella? triplicata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 521, pl. 95, figs. 17, 18.  
Helderbergian (Keyser): Cumberland, Maryland.  
*Holotype*.—Cat. No. 53310, U.S.N.M.

**HALLINA** Winchell and Schuchert. See *Zygospira* Hall.

**HALLOCERAS?** **HERCULES** Grabau and Shimer. See *Protophragmoceras hercules*.

**HALLOGRAPTUS BIMUCRONATUS** Lapworth. See *Lasiograptus bimucronatus*.

**HALLOPORA** Bassler.

Genotype: *Callopora elegantula* Hall.

- Callopora* Hall (not *Callopora* Gray, 1848), Pal. New York, 2, 1852, p. 144.—  
Nicholson, Pal. Province Ontario, 1874, p. 61; Geol. Mag., n. s., 1, 1874, p. 13.—Hall, 28th Ann. Rep. New York State Mus., 1879, p. 114.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 154, 251.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 172.—Hall and Simpson, Pal. New York, 6, 1887, p. 15.—Miller, N. A. Geol. Pal., 1889, p. 295.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 372, 416; Geol. Minnesota, 1893, 3, p. 275; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 36, 186.—Grabau, Bull. Buffalo Nat. Sci., 7, 1901, p. 167; Bull. New York State Mus., 9, 1901, p. 167.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 741.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 40.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139.—Hennig, Archiv für Zool., 4, 1908, p. 48.  
*Hallopora* Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 325, 326; Zittel-Eastman Textb. Pal., 1913, p. 337.

**Hallopora ampla** (Ulrich).

- Callopora ampla* Ulrich, Geol. Minnesota, 3, 1893, p. 281, pl. 23, figs. 13-15, 18-20, 22, 23, 27, 28.  
Black River (Decorah) and Trenton (Prosser): Ramsey, Goodhue, and Fillmore Counties, Minnesota; Decorah, Iowa.  
*Cotypes*.—Cat. Nos. 43518, 45519, U.S.N.M.

**Hallopora andrewsi** (Nicholson).

*Chaetetes pulchellus* (not of Milne-Edwards and Haime) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 503, pl. 29, figs. 5-5b.—Nicholson, Pal. Ohio, 2, 1875, p. 195, pl. 21, figs. 5, 5a.

*Monticulipora* (*Heterotrypa*) *Andrewsii* Nicholson, Genus *Monticulipora*, 1881, p. 128, fig. 21, pl. 5, figs. 1, 1a.

*Callopora andrewsi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 187.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 785, pl. 8, figs. 9, 9a; pl. 27, fig. 7.

*Monticulipora andrewsi* (Van Cleve) Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 249, pl. 11, fig. 9.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 178.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 419, figs.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 200.

Maysville (Bellevue and Corryville): Cincinnati, Ohio, and vicinity; south-eastern Indiana.

**Hallopora angularis** (Ulrich).

*Callopora angularis* Ulrich, Geol. Minnesota, 3, 1893, p. 277, pl. 22, figs. 37-41.

Black River (Decorah): Minneapolis, Chatfield, and near Fountain, Minnesota. *Cotypes*.—Cat. No. 43520, U.S.N.M.

**Hallopora clausa** (Bassler).

*Callopora clausa* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 42, pl. 15, figs. 9-12. Clinton: Lockport and Rochester, New York: Grimsby, Ontario (Rochester); Osgood, Indiana (Osgood).

*Cotypes*.—Cat. No. 35530, U.S.N.M

**Hallopora dalei** (Milne-Edwards and Haime).

*Chaetetes Dalii* Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 266, pl. 19, figs. 6, 6a.

*Monticulipora Dalii* Milne-Edwards and Haime, British Foss. Corals, 1854, p. 265.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 277.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 419, fig.

*Monticulipora* (*Heterotrypa*) *ramosa* var. *dalei* Nicholson, Genus *Monticulipora*, 1881, p. 115, fig. 19, C, D, pl. 2, 4.

*Monticulipora ramosa* var. *dalei* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 182.—J. F. James, *ibid.*, 16, 1894, p. 205.

*Chaetetes approximatus* Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 502, pl. 29, fig. 3, 3a.—Nicholson, Pal. Ohio, 2, 1875, p. 193, pl. 21, fig. 3.

*Monticulipora approximatus* (Van Cleve) Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 250, pl. 11, fig. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 419.

*Callopora dalei* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 188.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139, fig. 194.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 792, pl. 8, fig. 11; pl. 27, fig. 12; Bull. Geol. Soc. Amer., 23, 1912, p. 367, pl. 19, figs. 7, 8.

Maysville: Cincinnati, Ohio, and vicinity (Mount Hope and Fairmount); Central Tennessee (Leipers).

**Hallopora dumalis** (Ulrich).

*Callopora dumalis* Ulrich, Geol. Minnesota, 3, 1893, p. 282, pl. 23, figs. 1-8.

*Hallopora dumalis* Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 331, fig. 207.



**Hallopora dumalls**—Continued.

Black River (Decorah) and Trenton (Prosser): St. Paul and Cannon Falls, Minnesota.

Ordovician (Kuckers): Reval, Esthonia, Russia.

*Cotypes*.—Cat. No. 43517, U.S.N.M.

**Hallopora elegantula** (Hall).

*Callopora elegantula* Hall, Pal. New York, 2, 1852, p. 144, pl. 40, figs. a-m; 28th Ann. Rep. New York State Mus., 1879, p. 115; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 237.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 250, pl. 11, figs. 6-6b; Zittel's Textb. Pal. (Engl. ed.), 1896, figs. 456, A, B (p. 274).—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 18, figs. 1-7.—Grabau, Bull. New York State Mus., 45, 1901, p. 167, fig. 67; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 167, fig. 67.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 41, pl. 17, figs. 11-15; pl. 26, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 140, figs. 195a-b.

*Hallopora elegantula* Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 334, 335, fig. 210.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 337, figs. 491a, b.

*Callopora nana* Nicholson, Ann. Mag. Nat. Hist., 5th ser., 13, 1884, p. 120.

Niagaran: Lockport, Rochester, etc., New York; Ontario (Rochester); Waldron, Indiana; Newsom, Tennessee (Waldron); Osgood, Indiana (Osgood); Sterling, Illinois; Louisville, Kentucky; West Tennessee, etc. Wenlock shale of England and Gotland.

*Plesiotypes*.—Cat. Nos. 35528, 43648, U.S.N.M.

**Hallopora frondosa** (Cumings).

*Callopora frondosa* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 785, pl. 9, figs. 1, 1a.

Richmond (Whitewater): Richmond, Indiana.

**Hallopora goodhuensis** (Ulrich).

*Callopora goodhuensis* Ulrich, Geol. Minnesota, 3, 1893, p. 282, pl. 23, figs. 9, 10, 21, 29.

*Hallopora goodhuensis* Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 327, figs. 203, 204.

Trenton (Prosser): St. Paul, Cannon Falls, etc., Minnesota.

Ordovician (Wassalem and Wesenberg): Esthonia, Russia.

*Cotypes* and *plesiotype*.—Cat. Nos. 43524, 57460, U.S.N.M.

**Hallopora incontroversa** (Ulrich).

*Callopora incontroversa* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 96; Geol. Minnesota, 3, 1893, p. 278, pl. 22, figs. 33-36.

Black River (Decorah): Minneapolis, St. Paul, and Preston, Minnesota.

*Holotype*.—Cat. No. 43521, U.S.N.M.

**Hallopora magnopora** (Foerste).

*Callopora magnopora* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 173; 3, pl. 16, fig. 5; Geol. Surv. Ohio, 7, 1895, p. 600, pl. 29, fig. 5.—Bassler, Bull. U. S.

Geol. Surv., 292, 1906, pp. 42, 43, pl. 15, figs. 1-8; pl. 26, fig. 3.

Upper Medinan (Brassfield): Dayton and Centerville, Ohio.

Clinton (Rochester): Grimsby, Ontario.

*Plesiotypes*.—Cat. Nos. 35532, 44131, U.S.N.M.

**Hallopora multitabulata** (Ulrich).

*Monotrypella multitabulata* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 100.

**Hallopora multitalbulata**—Continued.

*Callopora multitalbulata* Ulrich, Geol. Minnesota, 3, 1893, p. 280, pl. 23, figs. 11, 12, 16, 17, 24–26, 30, 31; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 456, C, D (p. 274).—Sardeson, Jour. Geol., 9, 1901, p. 9, pl. A, figs. 5–6d.—Ruedemann, Bull. New York State Mus., 49, for 1901, 1902, p. 13.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 42, pl. 1, fig. 2.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 22, pl. 1, figs. 5–7.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139, figs. 188n, 190n.

*Hallopora multitalbulata* Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 326, 327, fig. 202; Zittel-Eastman Textb. Pal., 1913, p. 337, fig. 491.

*Monticulipora kentuckensis* James, Paleontologist, No. 7, 1883, p. 57, pl. 2, figs. 1, 1b.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 180, pl. 2, figs. 6a–d.—J. F. James, *ibid.*, 16, 1894, p. 203.

Black River and Lower Trenton: Burgin, etc., Kentucky; Minneapolis, etc., Minnesota; Tennessee; Ontario; New York; Iowa; etc.

*Cotypes*.—Cat. Nos. 43522, 43523, U.S.N.M.

**Hallopora nodulosa** (Nicholson).

*Chaetetes? nodulosus* Nicholson, Quar. Jour. Geol. Soc. London, 30, 1874, p. 506, pl. 29, figs. 9, 9a.; Pal. Ohio, 2, 1875, p. 200, pl. 21, figs. 10, 10a; Ann. Mag. Nat. Hist., ser. 4, 18, 1876, p. 87, pl. v. 3.

*Monticulipora* (Heterotrypa) *nodulosa* Nicholson, Genus *Monticulipora*, 1881, p. 116, pl. 1, figs. 4–4d.

*Monticulipora nodulosa* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 182.—J. F. James, *ibid.*, 16, 1894, p. 206.

*Callopora nodulosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252; *ibid.*, 6, 1883, p. 83.—Nickles, Kentucky Geol. Surv. Bull. No. 5, 1905, p. 50, pl. 2, figs. 8, 9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 786, pl. 9, figs. 2–2c; pl. 27, fig. 8.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

**Hallopora onealli** (James).

*Chaetetes? O'Nealli* James, Introd. Catal. Low. Sil. Foss., 1875, p. 2.

*Monticulipora o'nealli* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 174.—J. F. James, *ibid.*, 16, 1894, p. 194.

*Callopora onealli* Miller, N. A. Geol. Pal., 1889, p. 296.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 23, pl. 6, figs. 1, 2.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 786, pl. 9, figs. 3–3b; pl. 27, figs. 9, 10.

Eden: Cincinnati, Ohio, and vicinity (Economy); New York (Indian Ladder).

**Hallopora onealli communis** (James).

*Monticulipora* (Heterotrypa) *o'nealli? var. communis* James, Paleontologist, No. 6, 1882, p. 47; *ibid.*, No. 7, 1888, pl. 1, 8.

*Monticulipora communis* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 175, pl. 2, figs. 5a, b.—J. F. James, *ibid.*, 16, 1894, p. 195.

*Callopora onealli-communis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 190.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 24, pl. 1, fig. 13; pl. 4, figs. 8, 9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 788, pl. 8, fig. 10; pl. 27, fig. 11.

Eden (Economy)—McMicken): Cincinnati, Ohio, and vicinity.

*Plesiotypes*.—Cat. No. 35394, U.S.N.M.

**Hallopora onealli sigillarioides** (Nicholson).

*Chaetetes sigillarioides* Nicholson, Pal. Ohio, 2, 1875, p. 203, pl. 22, figs. 9, 9a; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 87, pl. 5, fig. 2.



**Hallopora onealli sigillarioides**—Continued.

*Callopora sigillarioidea* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252; 6, 1883, p. 83.

*Callopora sigillarioides* Miller, N. A. Geol. Pal., 1889, p. 296, fig. 464.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 50, pl. 2, figs. 10, 11.—Bassler, Virginia Geol. Surv., Bull. 2a, 1909, pl. 14, fig. 3.

*Callopora onealli-sigillarioides* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 191.—Cumings, Amer. Geol., 28, 1901, p. 374.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, pl. 6, figs. 3, 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 789, pl. 9, fig. 4.

*Monticulipora* (*Heterotrypa*) O'Neill (not James) Nicholson, Genus *Monticulipora*, 1881, p. 118, pl. 3, figs. 3–3f.

Eden (Economy—McMicken): Cincinnati, Ohio, and vicinity.

*Plesiotypes*.—Cat. No. 35395, U.S.N.M.

**Hallopora pulchella** (Ulrich).

*Callopora pulchella* Ulrich, Geol. Minnesota, 3, 1893, p. 283, pl. 22, figs. 1–12.

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 43525, U.S.N.M.

**Hallopora pulchella persimilis** (Ulrich).

*Callopora pulchella* var. *persimilis* Ulrich, Geol. Minnesota, 3, 1893, p. 284, pl. 22, figs. 13–17.

Black River (Decorah): Near Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 43526, U.S.N.M.

**Hallopora ramosa** (D'Orbigny).

*Monticulipora ramosa* D'Orbigny, Prodr. de Pal., 1, 1850, p. 25.—Milne-Edwards and Haime, British Foss. Corals, 1854, p. 265.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 277.—Nicholson, Tab. Corals Pal. Period, 1879, p. 274, fig. 35b.—Zittel, Handb. Pal., 1, 1880, p. 614, fig. 446b.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 181; *ibid.*, 16, 1894, p. 204.—Miller, N. A. Geol. Pal., 1889, p. 197, fig. 198.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 6, pl. 2, figs. 6–8.

*Chaetetes ramosus* Milne-Edwards and Haime, Pal. Foss. Terr. Pal., 1851, p. 266, pl. 19, figs. 2, 2a.—Nicholson, Ann. Mag. Nat. Hist., ser. 4, 18, 1876, p. 88.—Quenstedt, Roehren- und Sternkorallen, 1881, p. 77, pl. 146, figs. 13–18.

*Monticulipora* (*Heterotrypa*) *ramosa* Nicholson, Pal. Tab. Corals, 1879, p. 296, pl. 13, figs. 2, 2a; Genus *Monticulipora*, 1881, p. 110, fig. 18, pl. 2, figs. 2, 2a.—Zittel, Handb. Pal., 1, 1880, p. 615, fig. 447; Textb. Pal., English ed., 1896, fig. 185, p. 103, fig. 186B, p. 103.

*Heterotrypa ramosa* Nicholson in Steinmann, Neues Jahrb. Min., Geol. Pal., 1, 1882, pl. 4, fig. 1.

*Callopora ramosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252; 6, 1883, p. 83; Geol. Surv. Illinois, 8, 1890, p. 315, fig. 5b.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139, fig. 194, 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 790, pl. 9, figs. 5, 5a; pl. 10, fig. 1; pl. 27, fig. 13, 13a; Bull. Geol. Soc. Amer., 23, 1912, p. 368, pl. 20, fig. 16.

*Hallopora ramosa* Bassler, Zittel-Eastman Textb. Pal., 1913, p. 337, fig. 490.

*Chaetetes Dalei* (not of Milne-Edwards and Haime) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 501, pl. 29, figs. 1, 1a; Pal. Ohio, 2, 1875, p. 192, pl. 21, figs. 1, 1a.—Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 249, pl. 11, fig. 2.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

**Hallopora rugosa** (Milne-Edwards and Haime).

*Chaetetes rugosus* Milne-Edwards and Haime, *Pal. Foss. Terr. Pal.*, 1851, p. 268, pl. 20, figs. 6, 6a.—Nicholson, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 502, pl. 29, fig. 2; *Pal. Ohio*, 2, 1875, p. 193, pl. 21, fig. 2; *Ann. Mag. Nat. Hist.*, 4th ser., 18, 1876, p. 87, pl. 5, fig. 4.—Quenstedt, *Roehren-und Sternkorallen*, 1881, p. 78, pl. 146, figs. 19, 20.

*Monticulipora rugosa* Milne-Edwards and Haime, *British Foss. Corals*, 1854, p. 265.—Milne-Edwards, *Hist. Nat. des Corall.*, 3, 1860, p. 277.—Dybowski, *Die Chaetetiden d. Ost. Silur-Form.*, 1877, p. 92, pl. 3, fig. 1.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 172, fig.

*Monticulipora (Heterotrypa) ramosa* var. *rugosa* Nicholson, *Genus Monticulipora*, 1881, p. 113, fig. 19A, B, pl. 2, fig. 3.

*Monticulipora ramosa* var. *rugosa* James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 182.—James, *ibid.*, 16, 1894, p. 205.

*Callopora ramosa* var. *rugosa* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 252.—Cumings, 32d *Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1908, p. 793, pl. 10, fig. 2, pl. 27, figs. 14, 14a.

*Callopora rugosa* Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 192.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 140, fig. 194, 2.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

**Hallopora subnodosa** (Ulrich).

*Callopora subnodosa* Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 417, pl. 33, figs. 5, 5c, fig. 3d (p. 308).—Miller, *N. A. Geol. Pal.*, 1889, fig. 465 (p. 296).—Cumings, 32d *Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1908, p. 796, pl. 10, figs. 5, 5a.

Richmond: Blanchester, Waynesville, Hanover, and other localities in Ohio; Richmond and Versailles, Indiana; Wilmington and Savannah, Illinois; Iron Ridge, Wisconsin.

*Cotypes*.—Cat. No. 43393, U.S.N.M.

**Hallopora subplana** (Ulrich).

*Callopora subplana* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 253, pl. 11, figs. 7, 7b.—J. F. James, *ibid.*, 16, 1894, p. 196.—Cumings, 32d *Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1908, p. 795, pl. 10, figs. 4, 4a; pl. 27, fig. 15.

Maysville (Mount Hope and Fairmount): Covington, Kentucky, and vicinity.

*Cotypes*.—Cat. No. 43649, U.S.N.M.

**Hallopora undulata** (Ulrich).

*Callopora undulata* Ulrich, 14th *Ann. Rep. Geol. Nat. Hist. Surv. Minnesota*, 1886, p. 95; *Geol. Minnesota*, 3, 1893, p. 279, pl. 22, figs. 24–31.

*Hallopora undulata* Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, p. 332, fig. 208.

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

Ordovician (Wassaleum): Uxnorn, Esthonia, Russia.

*Cotypes*.—Cat. No. 43816, U.S.N.M.

**HALLOPORINA** Bassler.

Genotype: *Callopora crenulata* Ulrich.

*Calloporina* Ulrich and Bassler (not Neviani, 1895), *Smiths. Misc. Coll.*, *Quart.*, 47, 1904, p. 47.

*Callopora* Ulrich (part), *Geol. Minnesota*, 3, 1893, p. 275.

*Halloporina* Bassler, *Zittel-Eastman Textb. Pal.*, 1913, p. 337.

**Halloporina crenulata** (Ulrich).

*Callopora crenulata* Ulrich, *Geol. Minnesota*, 3, 1893, p. 284, pl. 22, figs. 18–23.

*Calloporina crenulata* Ulrich and Bassler, *Smiths. Misc. Coll.*, *Quart.*, 47, 1904, p. 47, pl. 14, figs. 17–19.

Black River (Decorah) and Trenton (Prosser): St. Paul and Cannon Falls, Minnesota; Decorah, Iowa; Neenah, Wisconsin.

*Cotypes*.—Cat. No. 43515, U.S.N.M.



**Halloporina parva** (Ulrich and Bassler).

*Calloporina parva* Ulrich and Bassler, *Smiths. Misc. Coll., Quart.*, 47, 1904, p. 48, pl. 14, figs. 13-16.

Black River: Near Belfast, Marshall County, Tennessee.

*Cotypes*.—Cat. No. 43217, U.S.N.M.

**HALYSITES** Fischer.

Genotype: *H. catenularia* Linnæus.

*Halysites* Fischer, *Zoognosia*, 3d ed., 1, 1813, p. 387; Notice sur les Polypiers Tubipores Fossiles, 1828, p. 15.—Fischer de Waldheim, *Oryct. Gouv. Moscou*, 1830, p. 163.—Edwards and Haime, *Compt. Rend. de l'Acad. Sci.*, 29, 1849, p. 261; *Mon. d. Polyp. Foss. d. Terr. Pal.*, 1851 (*Arch. du Mus. d'Hist. Nat.*, 5, 1851), pp. 155, 281.—McCoy, *British Pal. Rocks and Foss.*, 1854, p. 26.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 445.—Milne-Edwards, *Hist. Nat. d. Corall.*, 3, 1860, p. 286.—Duncan, *Rep. 41st Meeting British Assoc. Adv. Sci.*, 1872, p. 130.—Salter, *Cat. Camb. and Sil. Foss.*, 1873, p. 110.—Rominger, *Geol. Surv. Michigan*, 3, pt. 2, 1876, p. 77.—Lindstrom, *Ann. Mag. Nat. Hist.*, 4th ser., 18, 1876, p. 13.—Nicholson, *Tab. Corals Pal. Period*, 1879, p. 226.—Nicholson and Etheridge, *Mon. Sil. Foss. Girvan Dist.*, 1880, p. 274.—Roemer, *Leth. Geog.*, pt. 1, *Leth. Pal.*, 1883, p. 483.—Miller, *N. A. Geol. Pal.*, 1889, p. 191.—Sardeson, *Neues Jahrb. f. Min., Geol. and Pal.*, Beilage-Band, 10, 1896, p. 272.—Lambe, *Cont. Can. Pal.*, *Geol. Surv. Canada*, 4, pt. 1, 1899, p. 64.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 32, No. 1, 1899, p. 25.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 143; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 143.—Pocta, *Syst. Sil. du Centre Boheme*, 8, pt. 2, 1902, p. 268.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 96.

*Catenipora* Lamarck, *Hist. des Amer. sane Vert.*, 2, 1816, p. 206.—Say, *Amer. Jour. Sci. Arts*, 2, 1820, p. 34.—Eichwald, *Zool. Specialis*, pt. 1, *Vilnae*, p. 192.—Eaton, *Geol. Textb.*, 2d ed., 1832, p. 41.—Steininger, *Mem. Soc. Geol. France*, 1, 1834, p. 342.—Dana, *Wilkes U. S. Expl. Exped.*, 7, *Zoophytes*, 1838, pp. 430, 538.—Goldfuss, *Petrefacta*, 1826, pp. 74, 245; 2d ed., pt. 1, 1862, p. 70.—Say, *Bull. Amer. Pal.*, 1, 1896, p. 282 (reprint).

**Halysites agglomeratiformis** Whitfield.

*Halysites agglomeratiformis* Whitfield, *Amer. Mus. Nat. Hist.*, 13, 1900, p. 20, pl. 2, figs. 1, 2.

Niagaran: Cape Harrison, Princess Marie Bay, Arctic America.

**Halysites agglomeratus** Hall.

*Catenipora agglomerata* Hall, *Nat. Hist. New York, Geol.*, 4, tab. ill., 22, 1843, fig. 2; *Pal. New York*, 2, 1852, p. 129, pl. 35 (bis), fig. 2a-g.

*Halysites agglomerata* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 79 (gen. ref.).—Nicholson and Hinde, *Canadian Jour.*, n. s., 14, 1874, p. 146.—Nicholson, *Geol. Surv. Ohio, Pal.*, 2, 1875, p. 227; *Rep. Pal. Prov. Ontario*, pt. 2, 1875, p. 51, fig. 24; *Tab. Corals Pal. Foss.*, 1879, p. 22, fig. 9.—Lesley, *Geol. Surv. Pennsylvania, Rep. P* 4, 1889, p. 270, figs.—Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 2, 1895, p. 48.—Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 19, 1903, p. 490, pl. 42, figs. 3, 4.—Clarke and Ruedemann, *Mem. New York State Mus.*, 5, 1903, p. 34.

Niagaran: Sweden, Ogden, etc., New York (Lockport-Guelph); Milwaukee, etc., Wisconsin.

**HALYSITES AGGLOMERATUS** var. **COMPACTUS** Whiteaves. See *Halysites compactus*.

**Halysites catenularia** (Linnæus).

*Tubipora catenularia* Linnæus, *Syst. Nat.*, 12th ed., 1767, p. 1270.

*Halysites catenularia* Edwards and Haime, *Mon. d. Polyp. Foss. d. Terr. Pal.* (*Arch. du Mus. d'Hist. Nat.*, 5), 1851, p. 28.1 (Gives a long list of European

**Halysites catenularia**—Continued.

references). Mon. British Foss. Corals, Pal. Soc., 1854, p. 270, pl. 64, figs. 1-lc.—Emmons, Man. Geol., 1860, p. 111, fig. 101.—Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 25, pl. 2, fig. 7.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 287.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 66, fig. 2.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 85.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 146.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 227; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 51, figs. 24a, b; Tab. Corals Pal. Period, 1879, p. 22, figs. 9a, b, pl. 10, figs. 7, 7a; pl. 11, figs. 1, 1a.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 486, pl. 9, figs. 6a, 6b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 47.—Sardeson, Neues Jahrb. f. Min., Geol. and Pal., Beilage-Bd., 10, 1896, p. 272.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 68, pl. 3, figs. 1, 1a, b, 2, 2a, 3, 3a.—Schuchert, Amer. Geol., 31, 1903, p. 164.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 222, pl. 17, figs. 6-8.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 33.—Foerste, Cincinnati Soc. Nat. Hist., Jour. 21, 1909, p. 10.—Lambe, Cruise of the "Neptune," App., 4, 1906, p. 326.

*Tubipora catenulatus* Linnæus, Syst. Nat., 13th ed., 1789, p. 3753.

*Halysites catenulatus* Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., 1852, p. 228, pl. 6, fig. 11.—Billings, Canadian Nat. Geol., 1, 1856, p. 319, fig. 9.—Chapman, Canadian Jour., n. s., 6, 1861, p. 509, fig. 76; *ibid.*, 8, 1863, p. 211, fig. 216.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 305, fig. 303.—Chapman, Expos. Min. Geol. Canada, 1864, p. 103, fig. 76; p. 183, fig. 216.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 7, 52.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 78, pl. 29, figs. 1, 2, 4.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 582.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 49.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 577.—Whitfield, Geol. Wisconsin, 4, 1882, p. 271, pl. 13, figs. 5-7; p. 241, pl. 10, fig. 6.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 382, pl. 46, figs. 4-7.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 67, figs. 1-3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 270, figs.—Miller, N. A. Geol. Pal., 1889, p. 191, fig. 180.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 337.—Grabau, Bull. New York State Mus., 45, 1901, p. 143, fig. 39; Bull. Buffalo Soc. Nat. Sci., 8, 1901, p. 143, fig. 39.—Whitfield, Bull. Amer. Mus. Nat. Hist., 19, 1903, p. 489, pls. 41, 42, fig. 5.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, ill. sheet, 1903, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 96, fig. 153.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 220, pl. 26, fig. 8.

*Catenipora escharoides* Lamarck, Anim. sans. vertebres, 1st ed., 2, 1816, p. 207.—Say, Amer. Jour. Sci., 2, 1819, p. 34.—Goldfuss, Petrefacta, 1826, p. 74, pl. 25, figs. 4a-c; p. 245.—Eaton, Geol. Textb., 2d ed., 1832, p. 42, pl. 5, fig. 53.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 68.—Castelnau, Essai Syst. Sil. L'Amérique Septent., 1843, p. 45, pl. 17, fig. 3.—Hall, Geol. New York, 4, tab. ill., 22, 1843, fig. 1.—Owen, Geol. Expl. Iowa, Wisconsin, and Illinois, 2d ed., 1844, p. 33, pl. 7, fig. 2.—Hall, Amer. Jour. Sci. Arts, 2d ser., 7, March, p. 228.—Edwards and Haime, Mon. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d. Hist. Nat., 5), p. 284; Pal. New York, 2, 1852, p. 44, pl. 18, fig. 2; p. 127, pl. 35, figs. 1a-c; p. 325.—Marcou, Geol. Map. United States and British Prov., etc., 1853, p. 28, pl. 2, fig. 10.—Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 272, pl. 64, figs. 2, 2a.—Milne-Edwards, Hist.



**Halysites catenularia**—Continued.

Nat. d. Corall., 3, 1860, p. 289.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 70.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 271, fig.—Sardeson, Neues Jahrb. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 273.—Say, Bull. Amer. Pal., 1, 1896, p. 282 (reprint).

Silurian: A widely distributed species in all divisions of the Silurian in Europe and North America.

**Halysites catenularia amplitubulatus** Lambe.

*Halysites catenularia* var. *amplitubulata* Lambe, Contr. Canadian Pal., Geol. Surv. Canada, 1899, p. 71, pl. 4, figs. 4, 4a.

Silurian or Helderbergian: L'Anse a la Barbe and L'Anse au Gascon, Quebec.

**Halysites catenularia feildeni** (Etheridge).

*Halysites catenulatus* var. *Feildeni* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 582, pl. 28, fig. 1.

Niagaran: Cape Hilgard, Arctic America.

**HALYSITES CATENULARIA** var. **GRACILIS** Whiteaves. See *Halysites gracilis*.

**Halysites catenularia harti** (Etheridge).

*Halysites catenulatus* var. *Harti* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 583, pl. 28, fig. 2.

Niagaran: Cape Frazer, Arctic America.

**Halysites catenularia microporus** (Whitfield).

*Halysites catenulatus* var. *microporus* Whitfield, Geol. Wisconsin, 4, 1882, p. 272, pl. 13, fig. 6.

*Halysites catenularia* var. *micropora* Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 70, pl. 3, fig. 4.

Silurian (Racine, Guelph, and Cataract): Bailey's Harbor, etc., Wisconsin; Ontario.

**Halysites catenularia nitidus** Lambe.

*Halysites catenularia* var. *nitida* Lambe, Contr. Canadian Pal., Geol. Surv. Canada, 1899, p. 71, pl. 4, figs. 2a, 2b.

Silurian or Helderbergian: L'Anse a la Barbe, Baie des Chaleurs, and Neigette Falls, near Rimouski, Quebec.

**Halysites catenularia quebecensis** Lambe.

*Halysites catenularia* var. *Quebecensis* Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 69, pl. 4, figs. 1, 1a, b.

Black River or Richmond: Lake St. John, Quebec.

**HALYSITES CATENULATUS** of authors. See *Halysites catenularia*.

**HALYSITES CATENULATUS** var. **GRACILIS** Schuchert. See *Halysites gracilis*.

**HALYSITES CATENULATUS** var. **LABYRINTHICUS** Whitfield. See *Halysites labyrinthicus*.

**HALYSITES CATENULATUS** **NEXUS** Foerste. See *Halysites labyrinthicus*.

**Halysites compactus** Rominger.

*Halysites compactus* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 79, pl. 29, fig. 3.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 2 (loc. occ.).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 71, pl. 4, figs. 5, 5a, 6–8a.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 292.

**Halysites compactus**—Continued.

*Halysites agglomeratus* var. *compactus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 48.

Niagaran: Epoufette Point, Michigan; Elora, Galt, and Lake Temiscaming, Ontario; near Donald, British Columbia.

**HALYSITES ESCHAROIDES** Edwards and Haime. See *Halysites catenularia*.

**Halysites gracilis** (Hall).

*Catenipora gracilis* Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 212, pl. 29, figs. 1a, b; Rep. Geol. Surv. Wisconsin, 1862, p. 430.

*Halysites catenularia* var. *gracilis* Whiteaves, Pal. Foss., Geol. Surv. Canada., 3, pt. 3, 1897, p. 150.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 69, pl. 3, figs. 5, 5a, b, 6, 7.

*Halysites catenulatus* var. *gracilis* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 153.

Richmond: Green Bay, Wisconsin; Lake Winnipeg; Anticosti; Ontario; Baffin Land.

**Halysites labyrinthicus** (Goldfuss).

*Catenipora labyrinthica* Goldfuss, Petrefacta Germania, 1826, p. 75, pl. 25, figs. 5a, b; see also p. 245.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 63.—Vanuxem, Nat. Hist New York Geol., 3, 1842, p. 112.—Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 45, pl. 17, fig. 2.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 71.

*Halysites catenulatus* var. *labyrinthicus* Whitfield, Geol. Wisconsin, 4, 1882, p. 273, pl. 13, fig. 7.

*Halysites nexus* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 67, figs. 4, 5.—Foerste, Cincinnati Soc. Nat. Hist., Jour., 21, 1909, p. 10.

*Halysites catenulatus nexus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 338.

*Catenipora Michelini* Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 45, pl. 17, fig. 1.

*Catenipora meandrina* Troost, 5th Geol. Rept. Tennessee, 1840, p. 68.

*Halysites meandrina* Miller, N. A. Geol. Pal., 1889, p. 191 (gen. ref.).

Niagaran: Drummond Island, Lake Huron; Louisville, Kentucky (Louisville); Decatur and Perry Counties, Tennessee (Brownsport); Wisconsin.

**HALYSITES NEXUS** Davis. See *Halysites labyrinthicus*.

**Halysites parryi** (König).

*Catenipora Parryi* König, Supplement to App. of Captain Parry's Voyage for the Discovery of a Northwest Passage, in the years 1819–20, 1824, p. 251.

*Halysites parryi* Miller, N. A. Geol. Pal., 1889, p. 191 (gen. ref.).

Niagaran: Prince Regents Inlet, Arctic America.

**Halysites radiatus** Whitfield.

*Halysites radiatus* Whitfield, Bull. Amer. Mus. Nat. Hist., 19, 1903, p. 490, pl. 42, figs. 1, 2.

Niagaran: Jackson County, Iowa.

**Halysites sexto-catenatus** Owen.

*Halysites sexto-catenatus* Owen, Geol. Surv. Indiana, 1862, p. 362.

Niagaran: Huntington County, Indiana.

Observation.—Not recognized. Probably the same as *H. catenularia*.



**HAPLOCONUS** Raymond.Genotype: *Bathyrurus smithi* Billings.

*Haploconus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61; Zittel-Eastman Textb. Pal., 1913, p. 721.

**Haploconus brevimarginatus** (Walcott).

*Cyphaspis?* *brevimarginatus* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 93, pl. 12, fig. 10.

*Haploconus brevimarginatus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61 (gen. ref.).

Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.

*Holotype*.—Cat. No. 24646, U.S.N.M.

**Haploconus galenensis** (Clarke).

*Cyphaspis(?) galenensis* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 759, fig. 82.

*Haploconus galenensis* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61 (gen. ref.).

Trenton (Prosser): Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 41956, U.S.N.M.

**Haploconus smithi** (Billings).

*Bathyrurus Smithi* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 153, fig. 114a; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 56 (advance sheets, 1862).—

Miller, N. A. Geol. Pal., 1889, p. 534, fig. 973.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238, fig. 1595.

*Haploconus smithi* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 62, pl. 7, figs. 13, 14.

Trenton: Peterborough, Ontario.

**HAPLOCRINITES GRANULATUS** Troost. See *Haplocrinus granulatus*.

**HAPLOCRINITES HEMISPHERICUS** Troost. See *Pisocrinus quinquelobus*.

**HAPLOCRINITES MAXIMUS** Troost. See *Haplocrinus maximus*.

**HAPLOCRINITES OVALIS** Troost. See *Haplocrinus ovalis*.

**HAPLOCRINUS** Steininger.Genotype: *H. sphæroideus* Steininger.

*Haplocrinus* Steininger, Mem. Geol. Soc. France, 1, 1834, p. 232; Bull. Soc. Geol. France (Ser.), 8, 1837, p. 231.—Roemer, Rhein. Uebergangs., 1844, p. 63.—Steininger, Verstein. Eifel, 1849, p. 20.—Quenstedt, Handb. Petref., 1852, p. 624.—Steininger, Geogn. Beschr. Eifel, 1853, p. 36.—Muller, Verh. Nat. Verein, Jahrb., 12, 1855, p. 21.—Roemer, Leth. Geog. (Ausg. 3), 1855, p. 260.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 309.—Hall, 15th Rep. New York State Cab. Nat. Hist. for 1861, 1862, p. 143.—Dujardin and Hupe, Hist. Nat. Des. Zooph. Ech., 1862, p. 105.—Allman, Trans. Royal Soc. Edinburgh, 23, 1864, p. 247, fig. 2.—Schultze, Echin. Eifelk., 1866, p. 103; Denk. d. Kais. Akad. der Wiss., Math.-Naturw. Cl., 24, Abth. 2, 1866, p. 215, fig. 21.—DeKoninck, Bull. l'Acad. Roy. Belg., ser. 2, 3 (Extr. 63), 1868.—Zittel, Handb. Pal., 1, 1879, p. 347.—Quenstedt, Handb. Petref. (Ausg. 3), 1882, p. 964.—Carpenter, Challenger Rep. Crin., 1885, p. 158, etc.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 79, 83 (Rev. Pal., pt. 3, pp. 155, 159); *ibid.*, 1887, pp. 97–113; *ibid.*, 1888, pp. 339–363.—Miller, N. A. Geol. Pal., 1889, p. 252.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1890, pp. 354–390.—Bather, Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, pp. 20, 25, fig. 5.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1895, p. 204.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 151, figs. 35, 64.—Zittel, Grundzuge Pal., 1, 1910, p. 196.

*Aplocrinus* D'Orbigny, Prodr. Pal. Strat., 1, 1849, p. 102.

**Haplocrinus granulatus** (Troost).

- Haplocrinites granulatus Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 420; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).  
 Haplocrinus granulatus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 25, pl. 4, figs. 4, 5.  
 Niagaran (Brownsport): Decatur County, Tennessee.

**Haplocrinus maximus** (Troost).

- Haplocrinites maximus Troost, Amer. Jour. Sci. Arts., 2d ser., 8, 1849, p. 420; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).  
 Haplocrinus maximus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 26, pl. 4, figs. 6, 7, 8.  
 Niagaran (Brownsport): Decatur County, Tennessee.

**Haplocrinus ovalis** (Troost).

- Haplocrinites ovalis Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 420; Proc. Amer. Assoc. Adv. Sci., 2, p. 61 (nom. nud.).  
 Haplocrinus ovalis Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376; Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 25, pl. 4, fig. 3.  
 Niagaran (Brownsport): Decatur County, Tennessee.

**HARLANIA** Goeppert. See *Arthropycus* Hall.**HARLANIA HALLI** Goeppert. See *Arthropycus alleghaniensis*.**Harmodites rugosa** D'Orbigny.

- Harmodites rugosa D'Orbigny, Prodr. Pal., 1, 1849, p. 50.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 296.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 7, pl. 9, fig. 5.

Silurian(?): Falls of the Ohio.

Observation.—The figures of Boule and Thevenin refer to a Devonian species of *Syringopora*.

**HARPES** Goldfuss.

Genotype: *Trilobites ungula* Sternberg.

- Harpes Goldfuss, Nova Acta Physico-Med., 19, 1839, p. 358; Neues Jahrb. f. Min., etc., 1843, pp. 540, 548.—Portlock, Rep. Geol. Londonderry, 1843, p. 265.—Burmeister, Org. der Tril., Berlin, 1843, p. 87.—Emmrich, Neues Jahrb. f. Min., etc., 1845, p. 45.—Beyrich, Untersuchung über Tril., 1846, p. 32.—Hawle and Corda, Abh. böhm. Gesell. d. Wiss., 5 (extract), 1847, p. 162, pl. 7, fig. 83.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 777; Syst. Sil. du Centre Bohème, 1, 1852, p. 343, pl. 8, 9.—Angelin, Pal. Scandinavica, 3d ed., Holmia, 1854, p. 86.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 487.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 1881, p. 65.—Clarke, Jour. Morph., 2, 1888, pp. 265, 266.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1889, p. 29.—Miller, N. A. Geol. Pal., 1889, p. 549.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 756.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15, fig. 9, fig. 3.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 105, 184, 185, pl. 3, fig. 11.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, no. 8, 1901, pp. 27, 31.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 258.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 711.

**HARPES** (part) of American authors. See *Eoharpes* Raymond.**Harpes telleri** Weller.

- Harpes telleri Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 213, pl. 20, fig. 2.  
 Niagaran (Racine): Milwaukee, Wisconsin.



**HARPIDES** Beyrich.Genotype: *Harpides hospes* Beyrich.

*Harpides* Beyrich, *Unters. Tril.*, 1846, p. 34.—Hawle and Corda, *Abh. d. k. böhmischen Gesell. d. Wiss.*, 5 (extract), 1847, pp. 161, 166, pl. 7, fig. 84.—Barrande, *Neues Jahrb. f. Min.*, etc., 1850, p. 780.—Pictet, *Traité de Pal.*, 2d ed., 2, 1854, p. 498.—Angelin, *Pal. Scandinavica*, 3d ed., *Holmiae*, 1878, p. 86.—Zittel, *Handb. Pal.*, 2, 1885, p. 625.—Miller, *N. A. Geol. Pal.*, 1889, p. 549.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7th ser., 42, 1894, p. 63.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 24.—Frech, *Leth. geog.*, 1 Th., *Leth. Pal.*, 2, 1897, p. 44, footnote.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 185.—Lindstrom, *Kongl. Sven. Vet. Akad. Handl.*, 34, no. 8, 1901, pp. 27, 31, 32.

*Dictyocephalites* Bergeron, *Bull. Soc. Geol. de France*, 3d ser., 23, p. 469, pl. 4, figs. 4, 5.—Pompeckj, *Ein neuentdecktes Vorkommen von Tremadoc-Fossilien bei Hof*, 1896, p. 12; *Neues Jahrb. f. Min.*, 1, 1897, p. 548.—Reed, *Geol. Mag.*, dec. 4, 5, 1898, p. 496.

**HARPIDES? AMERICANUS** Frech. See *Arethusina americana*.

**Harpides atlanticus** Billings.

*Harpides Atlanticus* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 281, fig. 267.

Chazyan (Quebec—P): Four miles northeast Portland Creek, Newfoundland.

**Harpides concentricus** Billings.

*Harpides concentricus* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 282, fig. 268.

Chazyan (Quebec—P.): Four miles northeast Portland Creek, Newfoundland.

**Harpides(?) desertus** Billings.

*Harpides? desertus* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 333, fig. 321.

Canadian (Beekmantown): Bed of Pike River, Bedford, Canada.

**HARPINA** Novak. See *Eoharpes* Raymond.

**HARRISIA** Cleland. See *Clelandia* Cossman.

**HEBERTELLA** Hall and Clarke.Genotype: *Orthis sinuata* Hall.

Group of *Orthis occidentalis* Hall, *Bull. Geol. Soc. America*, 1, 1889, p. 20.

*Hebertella* Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 198, 222.—Winchell and Schuchert, *Geol. Minnesota*, 3, 1893, p. 432.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 266.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 254.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 888.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 381.

*Eridorthis* (subgenus of *Plectorthis*) Foerste, *Bull. Sci. Lab. Denison Univ.*, 14, 1909, p. 223.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 381. (Genotype, *Plectorthis* (*Eridorthis*) *nicklesi* Foerste.)

*Glyptorthis* Foerste, *Bull. Sci. Lab. Denison Univ.* 17, 1914, p. 257. (Genotype: *Hebertella insculpta* Hall.)

**Hebertella alveata** Foerste.

*Orthis occidentalis* Safford (not Hall, 1847), *Geol. Tennessee*, 1869, p. 275, fig. 11.—Meek, *Pal. Ohio*, 1, 1873, p. 96, pl. 9, fig. 3.—White, *Wheeler's Expl. Survey West 100th Merid.*, 4, 1875, p. 70, pl. 4, fig. 11.—Miller, *Cincinnati Quart. Jour. Sci.*, 2, 1875, p. 34.—Shaler, *Mem. Geol. Surv. Kentucky*, 1, 1876, pp. 37-39.—White, 2d Ann. Rep. Indiana Bur. Stat. and Geol., 1880, p. 485, pl. 2, figs. 10-12; 10th Rep. State Geol. Indiana, 1881, p. 117, pl. 2, figs. 10-12.—

**Hebertella alveata**—Continued.

Whitfield, Geol. Wisconsin, 4, 1882, p. 260, pl. 12, figs. 17, 18.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 31-34; pl. 35, figs. 16-21.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 174, fig., p. 155.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 525, figs.—Dennis, Proc. Indiana Acad. Sci. for 1898, 1899, p. 289.

*Hebertella occidentalis* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222, pl. 5A, figs. 11, 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 255, figs. 304f-h.—Cumings, 32d Ann. Dep. Geol. Nat. Res. Indiana, 1908, p. 906, pl. 34, fig. 4.

*Platystrophia occidentalis* Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, p. 75, pl. 3, fig. 3.

*Hebertella alveata* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 224, pl. 4, figs. 8a-b.

Richmond (Liberty, Whitewater): Ohio, Indiana, Kentucky.

**Hebertella alveata richmondensis** Foerste.

*Hebertella alveata-richmondensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 224, pl. 4, fig. 8c; 1910, 14, p. 55, pl. 5, figs. 10, 17.

Richmond (Whitewater): Richmond, Indiana.

**Hebertella battis** (Billings).

*Orthis Battis* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 185.

*Hebertella battis* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

**Hebertella (Glyptorthis) bellarugosa** (Conrad).

*Orthis bellarugosa* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 333.—Hall, Pal. New York, 1, 1847, p. 118, pl. 32, fig. 3.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 197, pl. 9, figs. 3a-d.—Shaler, Mem. Geol. Surv. Kentucky, 1, 1876, p. 35.—Lesley, Geol. Surv. Pennsylvania, Rep. P. 4, 1889, p. 507, figs.

*Hebertella bellarugosa* Hall and Clarke, Pal. New York, 7, pt. 1, 1892, p. 222.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 255, figs. 304d-e.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 245, pl. 36, figs. 8, 9, figs. 19, 20.

*Orthis* (*Hebertella*?) *bellarugosa* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 434, pl. 33, figs. 1-4.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 157.

*Glyptorthis bellarugosa* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 258 (gen. ref.).

Black River: Mineral Point, Janesville, Neenah, etc., Wisconsin; Minneapolis, St. Paul, Cannon Falls, etc., Minnesota; Decorah and McGregor, Iowa; Curdsville, Kentucky; Baffin Land.

Chazy (Valcour): Valcour Island, New York.

**Hebertella borealis** (Billings).

*Orthis borealis* Billings, Canadian Nat. Geol., 4, 1859, p. 436, fig. 14; Geol. Canada, 1863, p. 129, fig. 56; p. 167, fig. 148.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 510, figs.

*Hebertella borealis* Raymond, Ann. Carnegie Mus., 7, 1911, p. 241, figs. 13, 14.

Chazy: St. Martins Junction, near Montreal, Caughnawaga, etc., Canada (Aylmer); Valcour Island, New York (Valcour); East Tennessee (Lenoir).

**HEBERTELLA BOREALIS** Hall and Clarke. See *Hebertella frankfortensis*.

**Hebertella (Glyptorthis) crispata** (Emmons).

*Orthis crispata* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 404, fig. 5.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 379, fig. 5.—Emmons, Amer. Geology, 1, pt. 2, 1855, pl. 17, fig. 5; Man. Geol., 1860, p. 102, fig. 5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 512, figs.



**Hebertella (Glyptorthis) crispata**—Continued.

Dalmanella crispata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 224.—  
Glyptorthis crispata Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 258.  
Cincinnatian (Pulaski): Lorraine, etc., New York.

**Hebertella daytonensis** (Foerste).

Orthis daytonensis Foerste, Bull. Sci. Lab. Denison Univ., 1885, p. 87, pl. 13,  
figs. 13, 20, 21.  
Hebertella daytonensis Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.  
Orthis (Hebertella) daytonensis Foerste, Geol. Ohio, 7, 1895, p. 575, pl. 25, figs.  
13, 20, 21.  
Upper Medinan (Brassfield): Dayton, etc., Ohio.

**HEBERTELLA EXFOLIATA** Raymond. See *Plectorthis exfoliata*.

**HEBERTELLA (SCHIZONEMA) FASCIATA** Foerste. See *Orthostrophia (Schizoramma)* fasciata.

**Hebertella fausta** (Foerste).

Orthis fausta Foerste, Bull. Denison Univ., 1, 1885, p. 85, pl. 13, figs. 15, 16.  
Hebertella fausta Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.  
Orthis (Hebertella) fausta and var. squamosa Foerste, Geol. Ohio, 7, 1895, pp.  
573, 574, pl. 25, figs. 15a-15d, 16a, 16b; pl. 37A, figs. 19a, 19b.  
Upper Medinan: Dayton, Ohio (Brassfield); Ontario (Cataract).

**HEBERTELLA (SCHIZONEMA) FISSIPLICA** Foerste. See *Orthostrophia (Schioramma)* fissiplica.

**HEBERTELLA (SCHIZONEMA) FISSISTRIATA** Foerste. See *Orthostrophia (Schizoramma)* fissistriata.

**Hebertella frankfortensis** Foerste.

Orthis frankfortensis James, Cat. Lower Sil. Foss. Cincinnati Group, 1871, p. 10  
(nom. nud.).  
Hebertella frankfortensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p.  
318, pl. 7, figs. 11a, b.  
Orthis borealis Meek, Pal. Ohio, 1, 1873, p. 101, pl. 8, fig. 4.—Miller, Cincinnati  
Quart. Jour. Sci., 2, 1875, p. 28.—Chamberlin, Geol. Wisconsin, 1, 1883, p.  
155, fig.—Lesley (part), Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 510,  
figs.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889,  
p. 36, pl. 34, figs. 14-20.  
Orthis (Hebertella) borealis Winchell and Schuchert, Geol. Minnesota, 3, 1893,  
p. 433, fig. 33.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 157.  
Hebertella borealis Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.—  
Hayes and Ulrich, U. S. Geol. Surv. Folio 95, ill. sheet, 1903, figs. 36, 37.—  
Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 254, fig. 304a-c.—Bassler,  
Bull. Virginia Geol. Surv., 2a, 1909, p. 183, figs. 11, 12, 20.  
Trenton: Frankfort, etc., Kentucky (Wilmore); Columbia, etc., Tennessee;  
Virginia (Bigby); Wykoff, Minnesota (Prosser); Baffin Land.  
*Plesiotypes*.—Cat. Nos. 48572, 51189, U.S.N.M.

**Hebertella imperator** (Billings).

Orthis imperator Billings, Canadian Nat. Geol., 4, 1859, p. 435, figs. 11-13; Geol.  
Canada, 1863, p. 129, fig. 55.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4,  
1889, p. 518, figs.  
Hebertella imperator Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.—  
Raymond, Annals Carnegie Mus., 7, 1911, p. 243, pl. 36, figs. 6, 7.  
Chazy (Aylmer): Hawkesbury and Cornwall, Canada.

**Hebertella (Glyptorthis) insculpta (Hall).**

*Orthis insculpta* Hall, Pal. New York, 1, 1847, p. 125, pl. 32, fig. 12.—Billings, Geol. Canada, 1863, p. 167, fig. 150.—Meek, Pal. Ohio, 1, 1873, p. 99, pl. 9, fig. 1.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 40.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 195, pl. 9, fig. 12.—Shaler, Mem. Geol. Surv. Kentucky, 1, 1876, p. 30.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 520, figs.

*Orthis (Hebertella) insculpta* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 435.

*Hebertella insculpta* Hall and Clarke, Pal., New York, 8, pt. 1, 1892, p. 222, pl. 5A, fig. 13.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 255, fig. 305.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 905, pl. 34, figs. 2-2d.

*Glyptorthis insculpta* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 258 (gen. ref.).

*Orthis bellarugosa* (not Conrad) Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 35, fig. 22.

Richmond: Oxford, etc., Ohio; Indiana; Wilmington, Illinois; Wisconsin; Iowa; Minnesota; Tennessee; etc.

**Hebertella latasulcata Foerste.**

*Hebertella latasulcata* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 131, pl. 3, figs. 7a, b.

Trenton (Upper): Rogers Gap, etc., Kentucky.

**Hebertella lonensis (Walcott).**

*Orthis lonensis* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 74, pl. 11, fig. 6.

*Hebertella lonensis* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.

Upper Pogonip: Lone Mountain, Nevada.

*Holotype*.—Cat. No. 17232, U.S.N.M.

**Hebertella maria (Billings).**

*Orthis maria* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 137, fig. 114. (Adv. sheets, 1862.)

*Hebertella sinuata* or *maria*? Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222, pl. 5A, figs. 9, 10.

Richmond (English Head) and Gamachian (Ellis Bay): Gamache Bay, etc., Anticosti.

**Hebertella maria parkensis Foerste.**

*Hebertella maria-parkensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 319, pl. 7, figs. 6a-b.

Trenton: Between Pleasant Valley and Millersburg, etc. (Cynthiana), and Madison and Woodford Counties, Kentucky (Perryville).

**Hebertella (Eridorthis) nicklesi Foerste.**

*Plectorthis (Eridorthis) nicklesi* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 222, pl. 4, figs. 3a-d.

*Eridorthis nicklesi* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 132, pl. 1, figs. 5a-c.

Trenton (Upper): Rogers Gap, Brent, Ivor, etc., Kentucky; Point Pleasant, Ohio.

**HEBERTELLA (SCHIZONEMA) NISIS Foerste. See Orthostrophia (Schizoramma) nisis.**



**Hebertella occidentalis Hall.**

*Orthis occidentalis* Hall, Pal. New York, 1, 1847, p. 127, pl. 32A, fig. 2; pl. 32B, fig. 1; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 72.—Billings, Geol. Canada, 1863, p. 210, fig. 210.

*Hebertella occidentalis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 53, pl. 2, figs. 1, 2.

Maysville and Richmond: Maysville, etc., Kentucky; Cincinnati, Ohio, and vicinity; Oxford, etc., Ohio; Indiana.

Observation.—See also *H. alveata* Foerste.

**Hebertella occidentalis sinuata Hall.**

*Orthis sinuata* Hall, Pal. New York, 1, 1847, p. 128, pl. 32B, fig. 2.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 36.—Shaler, Fossil Brach. Ohio Valley, 1876, pl. 8.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 533, figs.

*Orthis occidentalis* var. *sinuata* Meek, Pal. Ohio, 1, 1873, p. 98.

*Hebertella sinuata* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222, pl. 5A, figs. 1-8.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, ill. sheet, 1903, fig. 17.—Cumings, Amer. Jour. Sci. (4), 15, 1903, p. 34, footnote.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 256, fig. 306.—Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 52, pl. 2, fig. 5.

*Hebertella occidentalis sinuata* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 229.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 908, pl. 34, figs. 3-3e.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Kentucky; Tennessee; Indiana; etc.

*Plesiotype*.—Cat. No. 35398, U.S.N.M. (Hayes and Ulrich).

**Hebertella (Eridorthis) rogersensis (Foerste).**

*Plectorthis (Eridorthis) rogersensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 223, pl. 14, figs. 4a-b.

Trenton (Upper): Rogers Gap, Kentucky.

Observation.—Probably only a variety of *H. nicklesi*.

**HEBERTELLA SCOVILLI** Hall and Clarke. See *Plectorthis (Austinella) scovilli*.

**HEBERTELLA SINUATA** Hall and Clarke. See *Hebertella occidentalis sinuata*.

**Hebertella subjugata (Hall).**

*Orthis subjugata* Hall, Pal. New York, 1, 1847, p. 129, pl. 32C, fig. 1.—Owen(?), Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, pl. 2B, figs. 4, 5.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 196.

*Hebertella subjugata* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 54, pl. 2, fig. 8; *ibid.*, 17, 1912, p. 129, pl. 8, fig. 6.

Trenton-Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee; Virginia, etc.

*Plesiotypes*.—Cat. Nos. 17885, 17891, U.S.N.M.

**Hebertella vulgaris Raymond.**

*Orthis perveta* Billings (not Conrad), Canadian Nat. Geol., 4, 1859, p. 434.

*Orthis subæquata* Billings (not Billings, 1856), Canadian Nat. Geol., 1859, p. 434.

*Orthis gibbosa* Billings, Canadian Nat. Geol., 4, 1859, p. 434.

*Hebertella vulgaris*, Raymond, Ann. Carnegie Mus., 3, 1906, p. 501; *ibid.*, 7, no. 2, 1911, p. 242, pl. 36, figs. 2-5, figs. 15-18, 22.

Chazy: Chazy, Valcour Island, etc., New York (Day Point—Valcour); Canada (Aylmer); East Tennessee (Lenoir).

**HELCION ORBICULATUS** D'Orbigny. See *Archinacella orbiculatus*.

**HELCION PATELLIFORMIS** D'Orbigny. See *Archinacella patelliformis*.

**HELCIONOPSIS** Ulrich and Scofield.

Genotype: *H. striata* Ulrich.

*Helcionopsis* Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, pp. 821, 826.—  
Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 604.

***Helcionopsis striata*** Ulrich.

*Helcionopsis striata* Ulrich, *Geol. Minnesota*, 3, pt. 2, 1897, p. 827, pl. 61, figs. 29 and 30. (*H. fissicostata* in error, p. 821.)—Grabau and Shimer, *N. A. Index*

*Fossils*, 1, 1909, p. 604, fig. 805a, b.—Foerste, *Jour. Geol.*, 11, 1903, p. 37.

*Triblidium striatum* Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 771 (gen. ref.).

Richmond: Marion County, Kentucky.

Maysville: Cincinnati, Ohio.

*Holotype*.—Cat. No. 45827, U.S.N.M.

***Helcionopsis subcarinata*** Ulrich and Scofield.

*Helcionopsis subcarinata* Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 827, pl. 61, fig. 28.

Trenton (Prosser): Goodhue County, Minnesota.

*Cotypes*.—Cat. No. 45828, U.S.N.M.

**HELETEROPHYLLUM** Grabau.

Genotype: *H. caliculoides* Grabau.

*Helenterophyllum* Grabau, *Michigan Geol. Surv., Geol. Ser.*, 1, 1909, p. 95.

***Helenterophyllum caliculoides*** Grabau.

*Helenterophyllum caliculoides* Grabau, *Michigan Geol. Surv., Geol. Ser.*, 1, 1909, p. 95, pl. 11, figs. 2-3.

Upper Monroan (Anderdon): Anderdon quarry near Amherstburg, Ontario.

Cayugan (Manlius): Manlius, New York.

**HELICOGRAFSUS** Nicholson. See *Nemagraptus* Emmons.

**HELICOPORA** Clappole.

Genotype: *H. latispiralis* Clappole.

*Helicopora* Clappole, *Proc. Amer. Assoc. Adv. Sci.*, 30, 1881, p. 191; *Quar. Jour.*

*Geol. Soc. London*, 39, 1883, p. 32.—Waagen and Pichl, *Pal. Indica*, ser. 13,

1885, p. 774.—Ulrich, *Contr. Amer. Pal.*, 1, 1886, p. 5.—Miller, *N. A. Geol. Pal.*,

1889, p. 308.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 396.—Simpson, 13th

*Ann. Rep. State Geol. New York* for 1893, 1895, pp. 722, 726; 47th *Ann. Rep.*

*New York State Mus.*, pp. 916, 920.—Ulrich, *Zittel's Textb. Pal. (Engl. ed.)*,

1896, p. 282.—Simpson, 14th *Ann. Rep. State Geol. New York* for 1894, 1897,

pp. 517, 522.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 39.

***Helicopora latispiralis*** Clappole.

*Helicopora latispiralis* Clappole, *Proc. Amer. Assoc. Adv. Sci.*, 30, 1881, p. 191;

*Quar. Jour. Geol. Soc. London*, 39, 1883, p. 32, pl. 4, figs. 1, 1a.—Simpson,

14th *Ann. Rep. State Geol. New York* for 1894, 1897, fig. 70, 1 (p. 518).

Niagaran: Cedarville, Greene County, Ohio.

**HELICOTOMA** Salter.

Genotype: *H. planulata* Salter.

*Helicotoma* Salter, *Canadian Org. Rem., Geol. Surv. Canada*, dec. 1, 1859, p. 13.—

Nicholson, *Rep. Pal. Prov. Ontario*, pt. 1, 1874, p. 120.—Miller, *N. A. Geol.*

*Pal.*, 1889, p. 405.—Koken, *Neues Jahrb. f. Min., Pal.*, 1, 1898, p. 24; *Bull. de*

*l'Acad. Imp. Sci. St. Petersburg*, 7, 1897, p. 159.—Ulrich and Scofield, *Geol.*

*Minnesota*, 3, 1897, p. 1032.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909,

p. 658.



***Helicotoma brocki* Foerste.**

*Helicotoma brocki* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 137, pl. 10, fig. 11; pl. 11, fig. 3.

Richmond: Kagawong, Manitoulin Island, Lake Huron.

***Helicotoma declivis* Ulrich.**

*Helicotoma declivis* Safford, Geol. Tennessee, 1869, p. 288 (nom. nud.).—Ulrich Geol. Minnesota, 3, pt. 2, 1897, p. 1036, pl. 74, figs. 34–38.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Cotypes*.—Cat. No. 46057, U.S.N.M.

***Helicotoma eucharis* Billings.**

*Helicotoma Eucharis* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 249, fig. 234a, b.—Miller, N. A. Geol. Pal., 1889, p. 405, fig. 677.

Chazy (Quebec-L, M): Table Head, Newfoundland.

***Helicotoma gorgonea* Billings.**

*Helicotoma Gorgonea* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 248. Canadian (Quebec—H): Table Head, Newfoundland.

***Helicotoma granosa* Ulrich.**

*Helicotoma granosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1035, pl. 82, figs. 32–34.

Black River (Lowville): High Bridge, Kentucky.

*Holotype*.—Cat. No. 45829, U.S.N.M.

**HELICOTOMA LARVATA** Salter. See *Liospira larvata*.

***Helicotoma marginata* Ulrich.**

*Helicotoma marginata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1036, pl. 74, fig. 39.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 963, pl. 40, fig. 10.

Richmond (Elkhorn): Near Richmond, Indiana.

*Holotype*.—Cat. No. 45830, U.S.N.M.

***Helicotoma misera* Billings.**

*Helicotoma miser* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 309. Ozarkian? (Levis—erratic): Point Levis, Quebec.

***Helicotoma missouriensis* Branson.**

*Helicotoma missouriensis* Branson, Trans. Acad. Sci. St. Louis, 18, no. 4, 1909, p. 44, pl. 7, figs. 11–12.

Black River (Auburn-Decorah): Lincoln County, Missouri.

***Helicotoma muricata* (Salter).**

*Helicotoma planulata* var. *muricata* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 14, pl. 2, fig. 8.

*Helicotoma muricata* Miller, N. A. Geol. Pal., 1889, p. 405.

Black River (Leray): Allumette Island, Ottawa River, Canada.

***Helicotoma naresii* Etheridge.**

*Helicotoma naresii* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 602, pl. 27, fig. 3.

Niagaran: Offley Island, Arctic America.

***Helicotoma(?) peccatonica* Sardeson.**

*Helicotoma(?) peccatonica* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 97, pl. 5, figs. 1, 2.

Canadian (Shakopee): Near Argyle, Wisconsin.

***Helicotoma perstriata* Billings.**

*Helicotoma perstriata* Billings, Canadian Nat. Geol., 4, 1859, p. 356.

Chazy (Mingan): Mingan Islands, Quebec.

***Helicotoma planulata* Salter.**

*Helicotoma planulata* Salter, Can. Org. Rem., Geol. Surv. Canada, dec. 1, 1859, p. 14, pl. 2, figs. 5-7.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 39, fig. 3; p. 439.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 323 (loc. occ.).—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1033, pl. 74, figs. 16-17.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 658, figs. 906h, i.

Black River: Allumette Island, Ottawa River, etc. (Leray), Canada; Lincoln County, Missouri; Wisconsin; New York.

*Plesiotypes*.—Cat. No. 45831, U.S.N.M.

*HELICOTOMA PLANULATA* var. *MURICATA* Salter. See *Helicotoma muricata*.

***Helicotoma planulata robusta* Ulrich and Scofield.**

*Helicotoma planulata* var. *robusta* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1033, pl. 74, fig. 15.

Black River (Platteville): Jo Daviess County, Illinois.

*Holotype*.—Cat. No. 45832, U.S.N.M.

***Helicotoma planulatoides* Ulrich.**

*Helicotoma planulatoides* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 74, figs. 28-30.

Black River (Lowville): High Bridge, Kentucky; Tennessee.

*Holotype*.—Cat. No. 45833, U.S.N.M.

***Helicotoma proserpina* Billings.**

*Helicotoma Proserpina* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 247, fig. 233.

Canadian (Quebec—G): Cape Norman, Newfoundland.

***Helicotoma similis* Whitfield.**

*Helicotoma similis* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 31, pl. 1, figs. 1, 2.—Sardeson, Jour. Geol., 11, 1903, p. 481, fig. 19.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 56, fig. 2.

Canadian (Beekmantown): Providence Island, Lake Champlain, Vermont.

***Helicotoma? spinosa* Salter.**

*Helicotoma? spinosa* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 15, pl. 2, figs. 9, 10.

Black River (Leray): Allumette Island, Ottawa River, Canada.

***Helicotoma subquadrata* Ulrich.**

*Helicotoma subquadrata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 70, figs. 31-33.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Cotypes*.—Cat. No. 46058, U.S.N.M.

***Helicotoma tennesseensis* Ulrich and Scofield.**

*Helicotoma tennesseensis* Safford, Geol. Tennessee, 1869, p. 288 (nom. nud.).—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 74, figs. 20-24.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 659, figs. 906j, k.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

*Cotypes*.—Cat. No. 46059, U.S.N.M.



**Helicotoma tritonia** Billings.

*Helicotoma Tritonia* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 247.  
Canadian (Quebec—G): Cape Norman, Newfoundland.

**Helicotoma umbilicata** Ulrich and Scofield.

*Helicotoma umbilicata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 62, fig. 68; pl. 74, figs. 25–27.

Black River (Platteville): Minneapolis and St. Paul, Minnesota; Beloit, Mineral Point, etc., Wisconsin; Dixon, etc., Illinois.

*Cotypes*.—Cat. Nos. 45834, 45835, U.S.N.M.

**HELICOTOMA UNIANGULATA** Salter. See *Ophileta uniangulata*.

**Helicotoma uniangulata** (Hall).

*Euomphalus uniangulatus* Hall, Pal. New York, 1, 1847, p. 9, pl. 13, figs. 1, 1a.

*Straparollus uniangulatus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 157.

*Helicotoma uniangulata* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 13 (gen. ref.).

Ozarkian (Little Falls): Saratoga County, New York.

**HELICOTOMA VAGRANS** Raymond. See *Eccyliopterus vagrans*.

**Helicotoma verticalis** Ulrich.

*Helicotoma verticalis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1035, pl. 62, fig. 69; pl. 74, figs. 18, 19.

Black River (Lowville): High Bridge, Kentucky.

*Holotype*.—Cat. No. 45836, U.S.N.M.

**Helicotoma whiteavesiana** Raymond.

*Helicotoma whiteavesiana* Raymond, Ann. Carnegie Mus., 4, 1908, p. 204, pl. 48, figs. 11, 12.

Stones River (Pamelia): Aylmer, Quebec, and Hog Back, near Ottawa, Ontario.

**HELIOLITES** Guettard.

Genotype: *H. interstinctus* Linnaeus.

*Heliolites* Guettard, Mem. 3, 1770, p. 454.—Dana, Wilkes' U. S. Expl. Exped., 7, Zoophytes, 1840, pp. 430, 541.—Edwards and Haime, Compt. Rend. l'Acad. Sci., 29, 1849, p. 262; Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1850, pp. 149, 212.—Hall, Pal. New York, 2, 1852, p. 130.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 438.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 234.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 10.—Nicholson, Trans. Royal Soc. Edinburgh, 27, 1876, pp. 247–248.—Lindstrom, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 13.—Zittel, Handb. Pal., 1, 1879, p. 212.—Nicholson, Tab. Corals Pal. Period, 1879, p. 243.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 241.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 503.—Koch, Palaeontographica, 29, 1883, pp. 333, 343.—Miller, N. A. Geol. Pal., 1889, p. 191.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 152.—Koken, Die Leitfossilien, Leipzig, 1896, p. 314.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, pp. 252, 263.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1909, p. 79.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, no. 1, 1909, pp. 35, 38.—Kiaer, Palaeontographica, 46, 1899, p. 39; Zittel-Eastman, Pal., 1, 1900, p. 108.—Grabau, Bull. New York State Mus., 45, 1901, p. 144; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 144.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 280.—Kiaer, Vid-Selsk. Skrifter, Math.-naturw., 10, 1903, pp. 42, 56.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 97; Zittel-Eastman, Textb. Pal., 2d ed., 1913, p. 112.

**HELIOLITES AFFINIS** Billings. See *Lyellia affinis* (Billings).

**Heliolites elegans** Hall.

*Heliolites elegans* Hall, Pal. New York, 2, 1852, p. 130, pl. 36, figs. 1a-g.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 383, pl. 48, fig. 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 273, fig.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 145, fig. 40; Bull. New York State Mus., 45, p. 145, fig. 40.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 98, fig. 157.

*Plasmopora elegans* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 15, pl. 3, fig. 2.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 11-13.

Niagaran: Lockport, etc., New York (Lockport); Michigan; Indiana; Kentucky.

**HELIOBITES EXIGUUS** Billings. See *Lyellia exigua*.

**Heliolites inordinatus** (Lonsdale).

*Porites inordinata* Lonsdale, In Murchison, Sil. Syst., 1839, p. 687, pl. 16 bis, figs. 12a-c.

*Heliolites inordinata* Milne-Edwards and Haime, Polyp. Foss. des Terr. Paleoz., 1851, p. 217; British Foss. Corals, 1855, p. 253, pl. 57, figs. 7, 7a.—Lambe, Contr. Canadian Pal., Geol. Surv. Canada, 1889, 4, pt. 1, p. 81.

Silurian: England and Ireland.

Helderbergian (?Silurian): West of l'Anse a la Barbe and l'Anse a la Vieille, Baie des Chaleurs, Canada.

**Heliolites interstinctus** (Linnæus).

*Madrepora interstincta* Linnæus, Syst. Nat., 12th ed., 1767, p. 1267.

*Heliolites interstincta* Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 249, pl. 57, figs. 9-9d; Polyp. Foss. Terr. Pal., 1851, p. 214.—Roemer, Sil. Fauna West. Tennessee, 1860, p. 23, pl. 2, fig. 5, 5a.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 305, fig. 301.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 12, pl. 1, fig. 1.—Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 252, pl. 2, figs. 1-3.—Nicholson, Sil. Foss. Girvan Dist., 1880, pp. 57, 254, pl. 16, figs. 1-4.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 506, pl. 9, figs. 3a-3c.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 3, 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 273, figs.—Miller, N. A. Geol. Pal., 1889, p. 192, fig. 181.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 47 (loc. occ.).—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 79, pl. 2, figs. 6, 6a.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 41, pl. 1, figs. 1-36; pl. 2, figs. 1, 2; pl. 3, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 97, fig. 156, 158a, b.

Silurian: Europe. Numerous localities in the Upper Medinan and Niagaran of North America.

**Heliolites? macrostylus** Hall.

*Heliolites macrostylus* Hall, Pal. New York, 2, 1852, p. 135, pl. 36A, figs. 2a-c.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 252.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 67.

Niagaran (Racine): Milwaukee, Wisconsin.

**Heliolites megastoma** (McCoy).

*Porites megastoma* McCoy, Sil. Foss. Ireland, 1846, p. 62, pl. 4, fig. 9f.

*Palæopora megastoma* McCoy, British Pal. Foss., 1854, p. 16, pl. 1c, fig. 4.

*Heliolites megastoma* Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 251, pl. 58, figs. 2-2d.—Rominger, Geol. Surv. Michigan, 3, pt. 2,



**Heliolites megastoma**—Continued.

1876, p. 11, pl. 1, fig. 3.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 581.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 97.  
 Silurian: Great Britain; New York; Canada; Michigan; Iowa; Wisconsin; Arctic America (Niagaran).

**HELIOLITES MICROPORUS** Eichwald. See *Heliolites subtubulatus*.

**HELIOLITES MURCHISONI** Milne-Edwards. See *Heliolites subtubulatus*.

**Heliolites perelegans** Whitfield.

*Heliolites perelegans* Whitfield, Amer. Mus. Nat. Hist., 13, 1900, p. 21, pl. 1, fig. 2.  
 Niagaran: Cape Harrison, Princess Marie Bay, Greenland.

**Heliolites pyriformis** Guettard.

*Heliolites pyriformis* Guettard, Mem. 3, 1870, p. 454.—Hall, Pal. New York, 2, 1852, p. 133, pl. 36A, fig. 1a-m.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 11, pl. 1, fig. 2.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 246.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 5, 6.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 67.—Grabau, Bull. New York State Mus., 45, 1901, p. 146, fig. 42.

Niagaran: Lockport, etc., New York (Lockport); Drummonds Island, Lake Huron; Iowa; Wisconsin; Kentucky.

**Heliolites shepardi** James.

Not recognized.

*Heliolites shepardi* James, Paleontologist, No. 1, 1878, p. 2; Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 152.

Richmond?: Brush Creek, Adams County, Ohio.

**HELIOLITES SPARSUS** Billings. See *Plasmopora petaliformis*.

**HELIOLITES SPECIOSUS** Billings. See *Lyellia speciosus*.

**Heliolites spiniporus** Hall.

*Heliolites spinipora* Hall, Pal. New York, 2, 1852, p. 131, pl. 36, fig. 2a-n.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Grabau, Bull. New York State Mus., 45, 1901, p. 145, fig. 41; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 145, fig. 41.

Niagaran: Lockport, New York (Lockport); Wisconsin (Racine).

**Heliolites spongiosus** Foerste.

*Heliolites spongiosa* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 303, pl. 3, fig. 3; pl. 4, fig. 6; and pl. 5, fig. 5.

Clinton (Waco): Near Irvine, Kentucky.

**Heliolites subtubulatus** (McCoy).

*Palaeopora interstincta* var. *subtubulata* McCoy, British Pal. Foss., 1851, p. 16, pl. 1, 1c, figs. 2a-b.

*Heliolites subtubulatus* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 13, pl. 1, fig. 4.—Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 7, 8.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 332; Geol. Surv. Ohio, Pal. 7, 1893, p. 601.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 80, pl. 2, figs. 7, 7a.—Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 304, pl. 3, figs. 5a, b.

**Heliolites subtubulatus**—Continued.

*Heliolites Murchisoni* Milne-Edwards and Haime, British Foss. Corals, 1855, p. 250, pl. 57, figs. 6a-c; Polyp. Foss. des Palaeoz., 1851, p. 215.

*Heliolites microporus* Eichwald, Leth. Rossica, 1860, p. 454, pl. 25, figs. 7a-c.

Silurian: Europe, Canada, Michigan, Iowa, Kentucky, Tennessee, Ohio, etc. (Niagaran).

**Heliolites subtubulatus distans** Foerste.

*Heliolites subtubulata-distans* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 3-5, pl. 3, fig. 5B.

Clinton (Waco): Near Waco and near Irvine, Kentucky.

**Heliolites subtubulatus nucella** Foerste.

*Heliolites subtubulata-nucella* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 305, pl. 3, fig. 5A.

Clinton (Waco): North of Estill Springs, Kentucky.

**HELIOLITES TENUIS** Billings. See *Protarea tenuis*.

**HELIOLITES VETUSTA** Hall. See *Protarea vetusta*.

**HELIOMERA** Raymond.

Genotype: *Cheirurus sol* Billings.

*Heliomera* Raymond, Amer. Jour. Sci., 20, 1905, p. 381.

**Heliomera sol** (Billings).

*Cheirurus sol* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 288, fig. 276.

*Heliomera sol* Raymond, Amer. Jour. Sci., 20, 1905, p. 381; Ann. Carnegie Mus., 7, no. 1, 1910, p. 77, pl. 18, fig. 12, fig. 9; 7th Rep., Vermont State Geol., 1910, p. 245, pl. 38, fig. 12.—Perkins, Rep. Vermont State Geol., 8th ser., 1912, pl. 18, fig. 12.

Chazy: Table Head and four miles northeast Portland Creek, Newfoundland (Quebec-N., P.); Chazy, New York (Day Point).

**HELIOPHRENTIS** Grabau.

Genotype: *H. alternata* Grabau.

*Heliophrentis* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 98.

**Heliophrentis alternata** Grabau.

*Heliophrentis alternatum* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 99, pl. 12, figs. 2, 3.

Upper Monroan (Amherstburg): Detroit River, near Amherstburg, Ontario.

**Heliophrentis alternata compressa** Grabau.

*Heliophrentis alternatum mutation compressa* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 100, pl. 13, figs. 4, 5.

Upper Monroan (Amherstburg): Detroit River bed, opposite Amherstburg, Ontario.

**Heliophrentis alternata magna** Grabau.

*Heliophrentis alternatum mut. magna* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 101, pl. 13, fig. 6.

Upper Monroan (Amherstburg): Detroit River bed, opposite Amherstburg, Ontario.

**Heliophrentis carinata** Grabau.

*Heliophrentis carinatum* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 101, pl. 12, fig. 2; pl. 13, fig. 7.

Upper Monroan: Near Amherstburg, Ontario, and Wayne County, Michigan (Amherstburg); Monroe County, Michigan (?Lucas).



**HELIOPHYCUS** Miller and Dyer.      Genotype: *H. stelliforme* Miller and Dyer.

*Heliophycus* Miller and Dyer, Cont. to Pal., no. 2, 1878, p. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 163.—Miller, N. A. Geol. Pal., 1889, p. 119.

**Heliophycus stelliforme** Miller and Dyer.

*Heliophycus stelliforme* Miller and Dyer, Contr. to Pal., no. 2, 1878, p. 2, pl. 3, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 120, fig. 39.

Maysville (Fairmount): Cincinnati, Ohio.

**HELIOPHYLLUM** Dana.

Genotype: *H. halli* Edwards and Haime.

*Heliophyllum* Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, Zoophytes, 1846, p. 356, pl. 26, figs. 3, 4; Amer. Jour. Sci. and Arts, 2d ser., 1, 1846, p. 183.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 170; p. 408.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 457.—Billings, Canadian Jour., n. s., 4, 1859, p. 124.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 401.—Ludwig, Palæontographica, 10, 1862, p. 183; p. 192.—Dybowski, Archiv. f. Naturf. Liv-, Ehst- und Kurl., 5, 1873, p. 339.—Nicholson, Canadian Nat., n. s., 7, 1874, p. 141; Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 24; Geol. Mag., dec. 2, 1, 1874, p. 58.—Nicholson and Thomson, Proc. Roy. Soc. Edinburgh, 9, 1876, p. 149.—Nicholson, Ann. Mag. Nat. Hist., ser. 5, 1, 1878, p. 44.—Zittel, Handb. Pal., 1, 1879, p. 231.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 342.—Trech, Pal. Abhandl. Dames and Kayser, 3, Heft 3, 1886, p. 53.—Miller, N. A. Geol. Pal., 1889, p. 192.—Sherzer, Amer. Geol., 6, 1890, p. 60; 7, 1891, pp. 230-295.—Koken, Die Leitfossilien, Leipzig, 1896, p. 310.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 124.

**Heliophyllum dentilineatum** Hall.

*Heliophyllum dentilineatum* Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 13), 1884, p. 417.

Niagaran (?Louisville): Louisville, Kentucky.

**Heliophyllum flos** Greene.

*Heliophyllum flos* Greene, Cont. Indiana Pal., pt. 3, 1899, p. 18, pl. 7, figs. 6-8.

Niagaran (Louisville): Louisville, Kentucky.

**Heliophyllum gemmiferum** Hall.

*Heliophyllum gemmiferum* Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 13), 1884, p. 417.

Niagaran (?Louisville): Near Louisville, Kentucky.

**Heliophyllum mitellum** Hall.

*Heliophyllum mitellum* Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 418. (Ext. 1882).

Niagaran (?Louisville): Louisville, Kentucky.

**Heliophyllum pegramense** Foerste.

*Heliophyllum pegramensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 100, pl. 3, fig. 58a, b.

Niagaran (Brownsport): Pegram, Tennessee.

**Heliophyllum pravum** Hall.

*Heliophyllum pravum* Hall, 12th Ann. Rep. Indiana, Dep. Geol. Nat. Hist., 1883, p. 274, pl. 15, fig. 12; pl. 25, fig. 4; 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 13) p. 417.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 280, figs.

Niagaran (Louisville): Louisville, Kentucky.

**Hellophyllum puteatum Hall.**

*Hellophyllum puteatum* Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 14), 1884, p. 418.

Niagaran (?Louisville): Louisville, Kentucky.

**HELLIPORA (CONSTELLARIA) ANTHELOIDEA** Rominger. See *Constellaria florida*.

**HELMINTHOLITUS** Linnæus. See *Conchidium* Linnæus.

**HELOCERAS** Barrande. See *Cycloceras* McCoy.

**HELOPORA Hall.**

Genotype: *H. fragilis* Hall.

*Helopora* Hall, Amer. Jour. Sci., 2d ser., 11, 1851, pp. 388, 389; Pal. New York, 2, 1852, p. 44.—Billings, Cat. Sil. Foss. Anticosti, p. 36.—Ulrich, Amer. Geol., 1, 1888, p. 231.—Miller, N. A. Geol. Pal., 1889, p. 308.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 401, 642; Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 191; Geol. Minnesota, 3, 1893, p. 189.—Poeta, Syst. Sil. Centre Boheme., 8, pt. 1, 1894, p. 8.—Zittel's Textb. Pal. (Engl. ed.), 1896, p. 280.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 548.—Nickles and Bassler, Bull. U. S. Geol. Surv., no. 173, 1900, p. 42.—Graßau, Bull. New York State Mus., 45, 1901, p. 172; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 172.—Hennig, Archiv. für Zool., K. Sven. Vet.-Akad. Stockholm, 3, 1906, p. 18.—Grabau and Shimer, N. A. Index Fossils, 1, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 747.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 149; Zittel-Eastman Textb. Pal., 1913, p. 342.

**Helopora alternata Ulrich.**

*Helopora alternata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 192, fig. 16f; Geol. Minnesota, 3, 1893, p. 192, pl. 3, fig. 9.

Black River (Decorah): Minneapolis, Minnesota.

*Holotype*.—Cat. No. 43566, U.S.N.M.

**Helopora approximata** James. Not recognized.

*Helopora approximata* James, Paleontologist, no. 1, 1875, p. 3.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 39.

Eden: Cincinnati, Ohio.

Observation.—Founded on some *Bythopora* (probably *B. arctipora*) with a bulbous extremity due to irregular growth.

**Helopora armata Billings.**

*Helopora armata* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 38.

Anticostian (Jupiter River): East Point, Anticosti.

**Helopora bellula Billings.**

*Helopora bellula* Billings, Catal. Sil. Foss. Anticosti, 1866, p. 38.

Anticostian (Gun River and Jupiter River): East Point, etc., Anticosti.

**HELOPORA CIRCE** Billings. See *Chilotrypa circe*.

**Helopora concava Billings.**

*Helopora concava* Billings, Catal. Sil. Foss. Anticosti, 1866, p. 37.

Anticostian (Becksie River—Jupiter River): East Jupiter River, East Point, etc., Anticosti.

**HELOPORA DENDRINA** James. See *Bythopora dendrina*.

**Helopora divaricata Ulrich.**

*Helopora divaricata* Ulrich, 14th Ann. Rep. Geol. Minnesota, 1886, p. 59; Geol. Minnesota, 3, 1893, p. 191, pl. 3, figs. 1-3.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 149, 150, fig. 72.



**Helopora divaricata**—Continued.

Black River (Decorah): Minneapolis, etc., Minnesota.

Middle Ordovician (Kuckers): Esthonia, Russia.

*Cotypes*.—Cat. No. 43568, U.S.N.M.

**Helopora elegans** Ulrich.

*Helopora elegans* Ulrich, Geol. Minnesota, 3, 1893, p. 194, fig. 11.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 837, pl. 29, fig. 9.

Richmond (Whitewater): Blanchester, Oxford, etc., Ohio; Richmond and Versailles, Indiana.

*Holotype*.—Cat. No. 43566, U.S.N.M.

**Helopora formosa** Billings.

*Helopora formosa* Billings, Catal. Sil. Foss. Anticosti, 1866, p. 37.

*Helopora nodosa* Billings, Catal. Sil. Foss. Anticosti, 1866, p. 38.

*Nematopora formosa* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 645.

Gamachian (Ellis Bay) and Anticostian (Beesie River—Jupiter River): East Point, East Jupiter River, East River, etc., Anticosti.

**Helopora fragilis** Hall.

*Helopora fragilis* Hall, Pal. New York, 2, 1852, p. 44, pl. 18, figs. 3a-f.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 141.—Nicholson, Pal. Province Ontario, 1875, p. 44, fig. 19, figs. 3, 3a.—Ulrich, American Geol., 1, 1888, p. 233, fig. 2a-e.—Miller, N. A. Geol. Pal., figs. 485a-e, 486 (p. 308).—Ulrich, Geol. Surv. Illinois, 8, p. 642, figs. 18a-e (p. 643), pl. 29, fig. 5a.—Grabau, Bull. New York State Mus., 45, 1901, p. 173, fig. 74; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 173, fig. 74.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152, fig. 207.

Upper Medinan (Cataract): Western New York; Flamborough Head, etc., Ontario.

Lower Clinton: Wayne County, etc., New York.

*Plesiotype*.—Cat. No. 43369, U.S.N.M.

**Helopora fragilis acadiensis** Hall.

Not defined.

*Helopora fragilis* var. *acadiensis* Hall, Canadian Nat. Geol., 5, 1860, p. 159.

Silurian: Nova Scotia.

**Helopora harrisi** James.

*Helopora harrisi* James, Paleontologist, No. 7, 1883, p. 58, pl. 2, figs. 2-2b.—Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 45; Geol. Minnesota, 3, 1893, p. 195, pl. 3, figs. 11b, c, 12.—Whiteaves, Pal. Foss., 3, pt. 2, 1895, p. 117.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 113-115 (p. 548).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 40, pl. 7, fig. 8.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 837, pl. 29, figs. 10-10b.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 343, fig. 501f.

Richmond: Waynesville, etc., Ohio; Indiana (Waynesville, Liberty); ?Stony Mountain, Manitoba.

*Plesiotypes*.—Cat. No. 43569, U.S.N.M.

**Helopora imbricata** Ulrich.

*Helopora imbricata* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 644, pl. 29, fig. 5.

Richmond: Wilmington, Illinois (Fernvale); Charleton Point, etc., Anticosti (Charleton).

Observation.—This form may be the tertiary segments of *Arthroclema angulare* Ulrich.

**HELOPORA IRREGULARIS** Billings. See *Trematopora irregularis*.

**HELOPORA LINEATA** Billings. See *Nematopora lineata*.

**Helopora lineopora** Billings.

*Helopora lineopora* Billings, Catal. Sil. Foss. Anticosti, 1866, p. 38.

*Nematopora? lineopora* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 645.

Gamachian (Ellis Bay) and Anticostian (Gun River): East of Jupiter River, etc., Anticosti.

**HELOPORA MEEKI** James. See *Dicranopora meeki*.

**Helopora mucronata** Ulrich.

*Helopora mucronata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 192, figs., fig. 16e; Geol. Minnesota, 3, 1893, p. 193, pl. 3, 10.

Trenton (Prosser): Cannon Falls and St. Paul, Minnesota.

*Cotypes*.—Cat. No. 43677, U.S.N.M.

**HELOPORA NODOSA** Billings. See *Helopora formosa*.

**HELOPORA PARVULA** James. See *Bythopora parvula*.

**Helopora quadrata** Ulrich.

*Helopora quadrata* Ulrich, Geol. Minnesota, 3, 1893, p. 193, fig. 10.

Trenton (Prosser): Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 43567, U.S.N.M.

**Helopora spiniformis** (Ulrich).

*Arthroclema spiniformis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 161, pl. 6, figs. 10, 10a.

*Helopora spiniformis* Ulrich, Geol. Minnesota, 3, 1893, pl. 3, figs. 4, 5, 6; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 469 (p. 233).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152, fig. 205j.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 343, fig. 502.

Stones River (Lebanon): Lebanon, Laverne, etc., Tennessee.

*Cotypes*.—Cat. No. 43665, U.S.N.M.

**HELOPORA STRIATOPORA** Billings. See *Thamniscus striatopora*.

**HELOPORA STRIGOSA** Billings. See *Glauconome strigosa*.

**HELOPORA TENUIS** James. See *Arthrostylus tenuis*.

**HELOPORA VARIPORA** Billings. See *Lioclema variporum*.

**HEMICOSMITES** Hall. See *Cœlocystis* Schuchert.

**HEMICRYPTURUS** Green. See *Asaphus Brongniart*.

**HEMICRYPTURUS CLINTONI** Van Ingen. See *Calymene clintoni*.

**HEMICYSTIS** Haeckel. See *Hemicystites* Hall.

**HEMICYSTITES** Hall.

Genotype: *H. parasiticus* Hall.

*Hemicystites* Hall, Pal. New York, 2, 1852, pp. 245, 355.—Chapman, Canadian Jour., n. s., 2, 1857, p. 304.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 305.—Hall, Pal. New York, 3, 1859, p. 152; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 81.—Zittel, Handb. Pal., 1, 1879, p. 414.—Miller, N. A. Geol. Pal., 1889, p. 252.—Jaekel, Stammes. Pelmat., 1, 1899, p. 49.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 207.—Zittel, Grundzüge Pal., 1, 1910, p. 182.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 473.

*Hemicystis* Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 111.



**HEMICYSTITES**—Continued.

*Cystaster* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, footnote, pl. 6 (adv. sheets 1871).—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 43.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 207, fig. 2. (Genotype: *Hemicystites granulatus* Hall.)

*Thecocystis* Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 43. (Genotype: *T. sacculus* Jaekel.)

***Hemicystites billingsi* (Chapman).**

*Agelacrinus billingsi* Chapman, Canadian Jour., 5, 1860, pp. 358, 204.

*Hemicystites* (*Agelacrinites*) *Billingsii* Sladen, Quart. Jour. Geol. Soc., 35, 1879, p. 750.

*Agelacrinites Billingsi* Chapman, Ann. Mag. Nat. Hist., 3d ser., 6, 1860, p. 157, fig.—Billings, Canadian Jour., n. s., 6, 1861, p. 516, fig. 86.—Chapman, *ibid.*, n. s., 8, 1863, p. 199, fig. 180; Expos. Min. Geol. Canada, 1864, p. 110, fig. 86; p. 171, fig. 180.

*Hemicystites Billingsi* Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 49 (gen. ref.).

Trenton (?Curdsville): Peterboro, Ontario.

***Hemicystites carnensis* Foerste.**

*Hemicystites carnensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 455, pl. 3, fig. 2.

Trenton (Upper): Carntown, Kentucky.

***Hemicystites* (*Cystaster*) *granulatus* Hall.**

*Hemicystites* (*Cystaster*) *granulatus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 6, figs. 1-4 (adv. sheets 1871).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 54, pl. 3, figs. 9a, b.

*Hemicystites granulatus* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 473, fig. 1784c.

*Hemicystis granulata* Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 112, pl. 3, figs. 27, 28.

*Thecocystis sacculus* Jaekel, Stammesges. Pelmat., 1, 1899, p. 43, pl. 1, figs. 1a, b. *Cystaster granulatus* Jaekel, *ibid.*, p. 44, pl. 1, fig. 2.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 206, fig. 2.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, pl. 6, fig. 5.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

***Hemicystites parasitica* Hall.**

*Hemicystites parasitica* Hall, Pal. New York, 2, 1852, p. 246, pl. 51, figs. 18-20.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 305, pl. 99, fig. 25.—Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1868, footnote, p. 357.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, 1899, Berlin, p. 49.

*Agelacrinus parasitica* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 81 (gen. ref.).

Clinton (Rochester): Lockport, New York.

***Hemicystites stellatus* Hall.**

*Hemicystites stellatus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1871, pl. 2, fig. 5, 6.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 52, pl. 3, figs. 8a, b.—Miller, N. A. Geol. Pal., 1889, p. 252, fig. 328.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 49.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 473, fig. 1784a.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, pl. 6, fig. 6.

**Hemicystites stellatus**—Continued.

*Agelacrinus* (*Hemicystites*) *stellatus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 215, pl. 6, figs. 5, 6 (adv. sheets, 1866).

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

**HEMIGYRASPIDIS** Raymond.

Genotype: *Asaphus affinis* McCoy.

*Hemigyraspis* Raymond, Ann. Carnegie Mus., 7, no. 1, 1910, p. 41; Trans. and Proc. Roy. Soc. Canada, 5, 3d ser., sec. 4, 1912, p. 117; Zittel-Eastman Textb. Pal., 1913, p. 719.

**Hemigyraspis collieana** Raymond.

*Asaphus marginalis* Collie (not Hall), Bull. Geol. Soc. Amer., 14, 1903, p. 413.

*Hemigyraspis collieana* Raymond, Ann. Carnegie Mus., 7, 1910, p. 41, pl. 14, figs. 9-13.

Canadian (Beekmantown): Bellefonte, Pennsylvania.

**Hemigyraspis liquensis** (Hoek).

*Ogygia liquensis* Hoek, Neues Jahrb. Min., Geol. Pal., 34, 1912, p. 230, pl. 14.

Lowest Ordovician: Near Camargo, Bolivia.

**Hemigyraspis mcconnelli** Raymond.

*Hemigyraspis mcconnelli* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 40, pl. 4, fig. 4.

*Hemigyraspis* sp. Raymond, Trans. Roy. Soc. Canada, 5, 1912, pl. 3, fig. 7.

Lower Ordovician (Ceratopyge beds): Three miles east of Golden, British Columbia.

**Hemigyraspis plana** (Matthew).

*Asaphellus*(?) *planus* Matthew, Bull. Nat. Hist. Soc. New Brunswick, no. 20, 1902, p. 419, pl. 18, fig. 11; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 237, pl. 18, fig. 11.

Canadian (Bretonian. Div. C 3c2): McLeod Brook, Boisdale, Cape Breton, Nova Scotia.

**HEMIPHRAKMA** Ulrich.

Genotype: *Batostoma irrasum* Ulrich.

*Batostoma* (in part) Ulrich, Geol. Surv. Illinois, 8, 1890, p. 379.

*Hemiphragma* Ulrich, Geol. Minnesota, 3, 1893, p. 299; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275.—Simpson, 14th Ann. Rep. State Geol. New York, 1894, 1897, p. 592.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 35.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 281, 282; Zittel-Eastman Textb. Pal., 1913, p. 338.

**Hemiphragma imperfectum** (Ulrich).

*Batostoma imperfectum* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 460, pl. 25, figs. 3-3d

*Hemiphragma imperfectum* Ulrich, Geol. Minnesota, 3, 1893, p. 301.

*Monticulipora imperfectum* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 196.

Richmond (Fernvale): Wilmington, Illinois; Tennessee; Texas.

Sections of *cotypes*.—Cat. No. 44061, U.S.N.M.

**Hemiphragma irrasum** (Ulrich).

*Batostoma irrasa* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 94.

*Hemiphragma irrasum* Ulrich, Geol. Minnesota, 3, 1893, p. 299, pl. 24, figs. 5-19; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 460 (p. 275).—Simpson, 14th Ann. Rep. State Geol. New York for the year 1894, 1897, figs. 190-193 (p. 592).—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 284-286, figs. 172, 173; Zittel-Eastman Textb. Pal., 1913, p. 338, fig. 493.



**Hemiphragma irrasum**—Continued.

Black River (Decorah) and Trenton (Prosser): Minneapolis, etc., Minnesota; Decorah, Iowa; Wisconsin; etc.

Middle Ordovician (Orthoceras limestone): Baltischport, Russia.

*Cotypes and plesiotype*.—Cat. Nos. 43564, 57417, U.S.N.M.

**Hemiphragma ottawaense** (Foord).

Batostoma Ottawaense Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 18, pl. 2, figs. 1-1f.

Hemiphragma ottawaense Ulrich, Geol. Minnesota, 3, 1893, p. 300, pl. 24, figs. 1-4.

Batostoma (Hemiphragma) ottawaense Sardeson, Jour. Geol., 9, 1901, p. 13.

Black River and Trenton: Ottawa and Paquettes Rapids, Ottawa River, Canada; Kenyon, Berne, and Mantorville, Minnesota.

**Hemiphragma tenuimurale** Ulrich.

Hemiphragma tenuimurale Ulrich, Geol. Minnesota, 3, 1893, p. 301, pl. 24, figs.

20-23.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 282, 283, figs. 170, 171.

Batostoma (Hemiphragma) tenuimurale Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 137, fig. 1901.

Trenton (Prosser): Goodhue County, Minnesota; Iowa.

Middle Ordovician (Wassalem): Uxnorn, near Reval, Esthonia, Russia.

*Cotypes and plesiotype*.—Cat. Nos. 43563, 57416, U.S.N.M.

**Hemiphragma whitfieldi** (James).

Monticulipora (Chaetetes) whitfieldi James, Paleontologist, no. 5, 1881, p. 34.

Monticulipora whitfieldi James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 178.—J. F. James, *ibid.*, 16, 1894, p. 200.

Batostoma (Hemiphragma) whitfieldi Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 137.

Hemiphragma whitfieldi Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 286.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 40, p. 8, figs. 15, 16; pl. 4, figs. 1-4; pl. 5, fig. 5.

Eden (Economy, Southgate): Cincinnati, Ohio, and vicinity.

*Plesiotypes*.—Cat. No. 35393, U.S.N.M.

HEMIPRONITES Meek and Hayden. See Strophomena Rafinesque.

HEMIPRONITES AMERICANUS Whitfield. See Clitambonites diversus.

HEMIPRONITES APICALIS Whitfield. See Polytechia apicalis.

HEMIPRONITES FILITEXTUS Miller. See Strophomena neglecta.

HEMIPRONITES PROPINQUUS Meek and Worthen. See Schuchertella propinqua.

HEMIPRONITES SUBPLANUS Meek and Worthen. See Schuchertella propinqua.

HEMIPRONITES SUBTENTA Miller. See Strophomena planumbona subtenta.

Hemisterias Rafinesque.

Not recognized.

Hemisterias Rafinesque, Bull. Soc. Geol. France, 10, 1839, p. 381.—Binney and Tryon's Complete Writings of Constantine Smaltz Rafinesque on Recent and Fossil Conch., 1864, p. 90.

Hemisterias quadriloba Rafinesque.

Hemisterias quadriloba Rafinesque, Binney and Tryon's Complete Writings of Constantine Smaltz Rafinesque on Recent and Fossil Conch., 1864, p. 90, fig. 1. Silurian?: Pennsylvania.

HEMITHIRIS INCREBESCENS D'Orbigny. See Rhynchotrema inaequivalve.

HEMITHIRIS SUBTRIGONALIS D'Orbigny. See Rhynchotrema subtrigonale.

**HEMITRYPA** Phillips.Genotype: *H. oculata* Phillips.

*Hemitrypa* Phillips, Pal. Foss., 1841, p. 27.—McCoy, Synop. Carb. Foss. Ireland, 1844, p. 204.—Pictet, Traité de Paleontologie, 2d ed., 4, 1857, p. 166.—Hall, 26th Ann. Rep. New York State Mus., 1874, p. 97; Rep. State Geol. New York for the year 1884, 1885, p. 36.—Ulrich, Contr. Amer. Pal., 1, 1886, p. 4.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 152.—Hall and Simpson, Pal. New York, 6, 1887, p. xxiii.—Miller, N. A. Geol. Pal., 1889, p. 309.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 396, 559.—Cole, Sci. Proc. Roy. Dublin Soc., n. s., 8, 1893, p. 132.—Pocta, Syst. Sil. Boheme, 8, pt. 1, 1894, p. 92.—Whidborne, Devon Fauna England (Pal. Soc. Publ.), 2, pt. 4, 1895, p. 177.—Simpson, 13th Ann. Rep. State Geol. New York for 1893, 1895, pp. 710, 726; 47th Ann. Rep. New York State Mus., 1895, pp. 904, 920.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 282.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pp. 507, 520.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 39.—Cumings, Amer. Jour. Sci., 17, 1904, p. 49; 30th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 1281.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 341.

**HEMITRYPA DUBIA** Hall. See *Loculipora ambigua* Hall.

**Hemitrypa ulrichi** Foerste.

*Hemitrypa ulrichi* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 152; *ibid.*, 3, 1888, pl. 15, fig. 2; Geol. Surv. Ohio, 7, 1895, p. 599, pl. 28, fig. 2.  
Upper Medinan (Brassfield): Near New Carlisle, Ohio.

**HERCOCRINUS** Hudson.Genotype: *H. elegans* Hudson.

*Hercocrinus* Hudson, Bull. New York State Mus., 107, 1907, p. 125.—Zittel, Grundzuge Pal., 1, 1910, p. 191.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 549.

**Hercocrinus elegans** Hudson.

*Hercocrinus elegans* Hudson, Bull. New York State Mus. Nat. Hist., 1907, 107, p. 125, pl. 9, and text fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 549.

Chazy (Valcour): Valcour Island, Lake Champlain, New York.

**Hercocrinus ornatus** Hudson.

*Hercocrinus ornatus* Hudson, Bull. 107, New York State Mus., 1907, p. 127, pl. 10, and text fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 549.  
Chazy (Valcour): Valcour Island, Lake Champlain, New York.

**HERCYNELLA** Kayser.Genotype: *H. beyrichi* Kayser.

*Hercynella* Kayser, Abhand. Geol. Specialk. Preus. Thur. Staaten, 2, 1878, p. 101.—Barrande, Syst. Sil., 4, pt. 3, 1911, p. 270.

**Hercynella buffaloensis** O'Connell.

*Hercynella buffaloensis* O'Connell, Bull. Buffalo Soc. Nat. Sci., 11, No. 1, 1914, p. 96, pl., figs. 1-3.  
Cayuga (Bertie): North Buffalo, New York.

**Hercynella canadensis** Grabau.

*Hercynella canadensis* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 195, pl. 25, figs. 5, 6.  
Upper Monroan (Amherstburg): Detroit River region of Michigan and Ontario.

**Hercynella patelliformis** O'Connell.

*Hercynella patelliformis* O'Connell, Bull. Buffalo Soc. Nat. Sci., 11, No. 1, 1914, p. 97, pl., figs. 4-6.  
Cayuga (Bertie): North Buffalo, New York.



**HERMATOSTROMA** Nicholson.Genotype: *H. schluteri* Nicholson.

*Hermatostroma* Nicholson, Mon. British Strom., Pal., Soc., 1886, p. 105; *ibid.*, 1892, pp. 218, 219.—Parks, Univ. Toronto Studies, Geol. Ser., no. 4, 1907, p. 34.—Zittel-Eastman Pal., 2d ed., 1913, p. 123.

**Hermatostroma guelphica** Parks.

*Hermatostroma guelphica* Parks, Univ. Toronto Studies, Geol. Series, no. 4, 1907, p. 34, pl. 4, figs. 1, 2; pl. 6, fig. 4, 3.

Niagaran (Guelph): Elora, Ontario.

**HERPETOCRINUS** Salter. See *Myelodactylus* Hall.

**HETEROCRINITES SIMPLEX** Troost. See *Ectenocrinus canadensis*.

**HETEROCRINUS** Hall.Genotype: *H. heterodactylus* Hall.

*Heterocrinus* Hall, Pal. New York, 1, 1847, p. 278.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 24.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 223.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 271.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 329.—Billings, Geol. Surv. Canada, dec. 4, 1859, p. 48, fig. 16.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376.—Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 147.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 210 (adv. sheets 1866).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 1.—Zittel, Handb. Pal., 1, 1879, p. 358.—Carpenter, Phil. Trans. Royal Soc. London, 174, 1884, p. 933.—Wachsmuth and Springer (part), Proc. Acad. Nat. Sci. Philadelphia, 3, 1886, pp. 127, 129 (Rev. Pal., pt. 3, sec. 2, pp. 187, 203, 205); *ibid.*, 1890, pp. 355-390.—Miller, N. A. Geol. Pal., 1889, p. 252.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 6; pl. 15, figs. 5a, b.—Bather, Kongl. Sv. Vet. Akad. Handl., 25, 1893, p. 25, fig. 6; Nat. Sci., 12, 1898, p. 343; Treatise on Zool. pt. 3, Echinoderma, London, 1900, p. 146, fig. 58, 2.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 713.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501.—Springer, Geol. Surv. Canada, Mem. 15P, 1911, p. 27; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 212.

*Stenocrinus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 111, 127, 130, 131 (Rev. Pal., 3, sec. 2, pp. 187, 203, 206, 207).—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 146.—Zittel, Grundzuge Pal., 1, 1910, p. 151. (Genotype: *Heterocrinus heterodactylus* Hall.)

**HETEROCRINUS ARTICULOSUS** Billings. See *Cremacrinus articulatus*.

**HETEROCRINUS BELLEVILLENSIS** W. R. Billings. See *Ohioocrinus bellevillensis*.

**HETEROCRINUS CANADENSIS** Billings. See *Ectenocrinus canadensis*.

**HETEROCRINUS CONSTRICTUS** Hall. See *Ohioocrinus constrictus*.

**HETEROCRINUS CONSTRICTUS** var. **COMPACTUS** Meek. See *Ohioocrinus compactus*.

**HETEROCRINUS CONSTRICTUS** var. **CONTRACTUS** Wachsmuth and Springer. See *Ohioocrinus compactus*.

**HETEROCRINUS CRASSUS** Meek and Worthen. See *Iocrinus crassus*.

**HETEROCRINUS DECACTYLUS** Emmons. See *Glyptocrinus decadactylus*.

**HETEROCRINUS EXIGUUS** Meek. See *Heterocrinus exilis exiguus*.

**Heterocrinus exilis** Hall.

*Heterocrinus exilis* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 213, pl. 5, fig. 16 (adv. sheets 1866 and 1871).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 5, pl. 1, fig. 12.

*Stenocrinus exilis* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

**Heterocrinus exilis exiguus** (Meek).

*Heterocrinus exiguus* Meek, Proc. Acad. Nat. Sci. Philadelphia, 23, 1, 1871, p. 308; *ibid.*, 1872, p. 308.

*Heterocrinus exilis* var. *exiguus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 293 (Rev. Pal., pt. 1, p. 70).

Eden: Cincinnati, Ohio, and vicinity.

**Heterocrinus? geniculatus** Ulrich.

*Heterocrinus geniculatus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 16, pl. 7, figs. 13, 13a, 13b, 13c.

*Stenocrinus geniculatus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., 3, sec. 2, p. 208).

Eden (Fulton): Cincinnati, Ohio, and vicinity.

Natural mold of *cotype*.—Cat. No. 42219, U.S.N.M.

**Heterocrinus? gracilis** Hall.

*Heterocrinus? gracilis* Hall, Pal. New York, 1, 1847, p. 280, pl. 76, figs. 3a, b; 12th Ann. Rep. Regents Univ. State New York, 1860, p. 69. —Ruedemann, Bull. New York State Mus., 162, 1912, p. 86, pl. 3, fig. 5.

Trenton (Snake Hill): Snake Hill, New York.

**Heterocrinus heterodactylus** Hall.

*Heterocrinus heterodactylus* Hall, Pal. New York, 1, 1847, p. 279, pl. 76, figs. 1a-o.—Emmons, Amer. Geology, 1, pt. 2, 1855, pl. 17, fig. 20.—Hall, 12th Ann. Rep. Regents Univ. State New York, 1860, p. 69.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 12, pl. 1, figs. 1a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 2, 3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 724, pl. 3, figs. 5, 5a.

*Stenocrinus heterodactylus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 130, 132 (Rev. Pal., pt. 3, sec. 2, pp. 206, 208).

Eden: Lewis, Jefferson, and Oneida Counties, New York; Cincinnati, Ohio, and vicinity.

**Heterocrinus heterodactylus propinquus** Meek.

*Heterocrinus heterodactylus propinquus* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 14, pl. 1, figs. 2a, b.

*Stenocrinus heterodactylus* var. *propinquus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., 3, pt. 2, p. 208), (gen. ref.).

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

**HETEROCRINUS INÆQUALIS** Billings. See *Cremacrinus inæqualis*.**HETEROCRINUS (ANOMALOCRINUS) INCURVUS** Meek and Worthen. See *Anomalocrinus incurvus*.**HETEROCRINUS ISODACTYLUS** Miller. See *Ohioocrinus compactus*.**Heterocrinus juvenis** Hall.

*Heterocrinus juvenis* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 212, pl. 5, figs. 9, 10 (adv. sheets 1866, p. 4, and 1871, pl. 1, figs. 9, 10).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 10, pl. 1, figs. 3a-c.—Miller, N. A. Geol. Pal., 1889, p. 252, fig. 329.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 283, fig.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 725, pl. 3, figs. 3, 3b.

*Stenocrinus juvenis* Wachsmuth and Springer, Proc. Acad. Nat. Sci., Philadelphia 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Maysville (Corryville): Lebanon, Ohio.



**HETEROCRINUS LAXUS** Hall. See *Ohiocrinus laxus*.

**Heterocrinus milleri** Wetherby.

*Heterocrinus Milleri* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 153, pl. 5, fig. 3.

*Stenocrinus Milleri* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Trenton (Curdsville): Mercer County, Kentucky; Kirkfield, Ontario.

**HETEROCRINUS CEHANUS** Miller. See *Ohiocrinus laxus*.

**Heterocrinus pentagonus** Ulrich.

*Heterocrinus pentagonus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 176, pl. 5, figs. 10 and 10a.

*Stenocrinus pentagonus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**HETEROCRINUS?** (*IOCRINUS*) **POLYXO** Hall. See *Iocrinus subcrassus*.

**HETEROCRINUS SIMPLEX** Hall. See *Ectenocrinus simplex*.

**HETEROCRINUS SIMPLEX** var. **GRANDIS** Meek. See *Ectenocrinus grandis*.

**HETEROCRINUS SUBCRASSUS** Meek and Worthen. See *Iocrinus subcrassus*.

**Heterocrinus tenuis** Billings.

*Heterocrinus tenuis* Billings, Geol. Surv. Canada, Rep. Progress, 1853-56, 1857, p. 273; Geol. Surv. Canada, dec. 4, 1859, p. 50, pl. 4, fig. 6a-b; pl. 10, figs. 1a-e.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 502.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 25.

*Stenocrinus tenuis* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Montreal, Quebec.

**HETEROCRINUS VAUPELI** Wetherby. See *Ohiocrinus constrictus*.

**HETEROCYSTITES** Hall.

Genotype: *H. armatus* Hall.

*Heterocystites* Hall, Pal. New York, 2, 1852, p. 229.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 303.—Hall, Pal. New York, 3, for 1859, 1861, p. 152.—Miller, N. A. Geol. Pal., 1889, p. 253.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 67, fig. 36, 7.

**Heterocystites armatus** Hall.

*Heterocystites armatus* Hall, Pal. New York, 2, 1852, p. 229, pl. 49A, figs. 3a-c.—Jaekel, Stammes. Pemat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 345.

Niagaran (Lockport): Lockport, New York.

**HETERODICTYA** Zittel. See *Ptilodictya Lonsdale*.

**HETERODICTYA PAVONIA** Ulrich. See *Escharopora pavonia*.

**HETERONEMA** Ulrich and Bassler. Genotype: *H. capillare* Ulrich and Bassler.

*Heteronema* Ulrich and Bassler, Smith. Misc. Coll., 45, 1904, p. 278.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 57; Zittel-Eastman Textb. Pal., 1913, p. 318.

**Heteronema? contextum** Ulrich and Bassler.

*Heteronema? contextum* Ulrich and Bassler, *Smiths. Misc. Coll.*, Quart., 45, 1904, p. 279, pl. 65, fig. 12.

Maysville (Corryville): Morrow, Ohio.

*Holotype*.—Cat. No. 43132, U.S.N.M.

**HETERORTHIS** Hall and Clarke.

Genotype: *Orthis clytie* Hall.

*Heterorthis* Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 207, 223; 11th Ann.

*Rep. New York State Geol.*, 1891, p. 268.—Schuchert, *Zittel-Eastman Textb.*

*Pal.*, 1913, p. 382.

**Heterorthis clytie** Hall.

*Orthis clytie* Hall, 14th *Rep. New York State Cab. Nat. Hist.*, 1861, p. 90; 15th

*Rep.*, *ibid.*, 18–62, pl. 2, figs. 4, 5.—Miller, *Cincinnati Quart. Jour. Sci.*, 2,

1875, p. 34.—Hall and Whitfield, *Pal. Ohio*, 2, 1875, p. 75, pl. 1, figs. 18, 19.—

Hall, 36th *Rep. New York State Mus. Nat. Hist.*, 1884, p. 75, pl. 3, fig. 7.—

Lesley, *Geol. Surv. Pennsylvania*, *Rep. P* 4, 1889, p. 512, figs.

*Heterorthis clytie* Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 202, 223,

pl. 5B, figs. 20–24.—Bassler, *Bull. Virginia Geol. Surv.*, 2a, pl. 24, fig. 1.

Trenton (Hermitage): Frankfort, Paris, etc., Kentucky; Virginia; Tennessee.

**HETEROSPONGIA** Ulrich.

Genotype: *H. subramosa* Ulrich.

*Heterospongia* Ulrich, *Amer. Geol.*, 3, 1889, pp. 234, 239.—Miller, *N. A. Geol.*

*Pal.*, 1889, p. 160.—James, *Jour. Cincinnati Soc. Nat. Hist.*, 14, 1891, p. 71.—

Winchell and Schuchert, *Geol. Minnesota*, 3, pt. 1, 1895, p. 78 (Ext., 1893).

**Heterospongia aspera** Ulrich.

*Heterospongia aspera* Ulrich, *Amer. Geol.*, 3, 1889, p. 241.—James, J. F., *Jour.*

*Cincinnati Soc. Nat. Hist.*, 14, pt. 1, 1891, p. 72.

Richmond (Arnheim): Marion and Lincoln Counties, Kentucky.

**Heterospongia knotti** Ulrich.

*Heterospongia knotti* Ulrich, *Amer. Geol.*, 3, 1889, p. 241, fig. 5.

*Heterospongia* cfr. *knotti* Foerste, *Bull. Sci. Lab. Denison Univ.*, 14, 1909, p.

303, pl. 9, fig. 2.

*Heterospongia subramosa-knotti* Foerste, *Ohio Nat.*, 12, 1912, p. 453, pl. 22, fig. 2.

Richmond (Arnheim): Near Lebanon, Kentucky.

*Holotype*.—Cat. No. 46557, U.S.N.M.

**Heterospongia subramosa** Ulrich.

*Heterospongia subramosa* Ulrich, *Amer. Geol.*, 3, 1889, p. 240, fig. 6, p. 236.—

James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 14, pt. 1, 1891, p. 71.—Winchell

and Schuchert, *Geol. Minnesota*, 3, pt. 1, 1895 (ext. 1893), p. 79, pl. G,

figs. 4–6.

Richmond (Arnheim): Marion and Lincoln Counties, Kentucky.

*Cotypes*.—Cat. Nos. 46558–46560, U.S.N.M.

**HETEROSPONGIA SUBRAMOSA KNOTTI** Foerste. See *Heterospongia knotti*.

**HETEROTRYPA** Nicholson.

Genotype: *Monticulipora frondosa* D'Orbigny.

*Heterotrypa* (in part) Nicholson, *Pal. Tabulate Corals*, 1879, p. 291; Genus *Mon-*

*ticulipora*, 1881, pp. 101, 103.—Zittel, *Handb. Pal.*, 1, p. 615.—Ulrich, *Jour.*

*Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 155; *ibid.*, 6, 1883, p. 83.—Foord,

*Contr. Micro-Pal. Cambro-Sil.*, 1883, p. 20.—Ulrich, *Jour. Cincinnati Soc.*

*Nat. Hist.*, 6, 1883, pp. 83–85.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883,

p. 471.—Rominger, *Amer. Geol.*, 6, 1890, pp. 114, 119.—Ulrich, *Geol. Sur.*

*Illinois*, 8, 1890, pp. 371, 413; *Geol. Minnesota*, 3, 1893, p. 267.—Zittel's



**HETEROTRYPA**—Continued.

Textb. Pal. (Engl. ed.), 1896, p. 104.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 273.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 578.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Cumings, Amer. Geol., 29, 1902, p. 199.—Ulrich and Bassler, Smith. Misc. Coll., Quart., 47, 1904, pp. 24, 25.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333.

**Heterotrypa affinis** (Ulrich).

Amplexopora affinis Ulrich, Geol. Sur. Illinois, 8, 1890, p. 450, pl. 36, figs. 2, 2a. Monticulipora affinis James, Jour. Cincinnati Soc. Nat. Hist., 16, pt. 5, 1894, p. 193. Heterotrypa affinis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 289. Richmond (Fernvale): Wilmington, Illinois.  
Sections of *holotype*.—Cat. No. 43769, U.S.N.M.

**HETEROTRYPA ANDREWSI** Nicholson. See *Hallopora andrewsi*.

**Heterotrypa foerstei** Nickles.

Heterotrypa foerstei Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 48, pl. 2, fig. 5.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 126.  
Trenton (Upper): Near Rogers Gap, Scott County, Kentucky.

**Heterotrypa frondosa** (D'Orbigny).

Monticulipora frondosa D'Orbigny, Prodr. de Pal., 1, 1850, p. 25.—Milne-Edwards and Haime, British Foss. Corals, 1854, p. 265.—Milne-Edwards, Hist. Nat. des. Corall., 3, 1860, p. 276.—White, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 380, pl. 48, figs. 2, 3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 420, figs.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 6, pl. 2, figs. 9, 10; pl. 3, figs. 1, 2.

Chætetes frondosus Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 267, pl. 19, figs. 5, 5a.—Quenstedt, Roehren- und Sternkorallen, 1881, p. 73, pl. 146, fig. 8 (not 3-5).

Chætetes frondosus limatus Quenstedt, Roehren- und Sternkorallen, 74, 1881, pl. 146, fig. 9.

Heterotrypa frondosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 23; *ibid.*, 6, 1883, p. 83.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 289.—Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 25, pl. 11, figs. 1-3.

Chætetes mammulatus (not D'Orbigny) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 508, pl. 30, figs. 2, 2b; Pal. Ohio, 2, 1875, p. 207.

Monticulipora (Heterotrypa) mammulata (not D'Orbigny), Nicholson, Pal. Tabulate Corals, 1879, p. 294, pl. 13, figs. 1, 1b; Genus Monticulipora, 1881, p. 104, pl. 6, figs. 1, 1g.

Monticulipora mammulata (not D'Orbigny) James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 16.—James, *ibid.*, 18, 1895, p. 69.

Dekayia frondosa Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 812, pl. 15, figs. 1-1e; pl. 28, fig. 9; pl. 29, fig. 1.

Dekayella cystata Cumings, Amer. Geol., 28, 1901, p. 375, pl. 35, figs. 1-6a.

Dekayia frondosa var. cystata Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 813, pl. 14, figs. 1, 1a; pl. 28, fig. 3.

Dekayia perfrondosa Cumings, Amer. Geol., 29, 1902, p. 207, 210, 212, pl. 9, figs. 9, 11-13, 15, 16; pl. 10, figs. 1, 6; pl. 11, fig. 6; pl. 12, fig. 2.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

Fragment of Edwards and Haime's *plesiotrype*.—Cat. No. 35113, U.S.N.M.

**Heterotrypa inflecta** Ulrich.

*Heterotrypa inflecta* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 414, pl. 37, figs. 2-2d.  
*Monticulipora inflecta* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895,  
 p. 77.

*Heterotrypa ulrichi-inflecta* Cumings, Amer. Geol., 29, 1902, p. 212, pl. 9, fig. 3.  
*Dekayia inflecta* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p.  
 814, pl. 15, figs. 2, 2a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 43367, U.S.N.M.

**Heterotrypa lobata** (Cumings).

*Dekayia ulrichi-lobata* Cumings, Amer. Geol., 29, 1902, p. 203, pl. 9, fig. 2; pl. 10,  
 fig. 5; pl. 11, figs. 3, 4; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908,  
 p. 815, pl. 27, fig. 21.

*Dekayia ulrichi-expansa* Cumings, Amer. Geol., 29, 1902, p. 212, pl. 9, figs. 5, 6;  
 pl. 11, fig. 7.

Maysville (Fairmount): Manchester Station, etc., Indiana; Cincinnati, Ohio,  
 and vicinity.

**Heterotrypa microstigma** Cumings and Galloway.

*Heterotrypa microstigma* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat.  
 Res. Indiana, 1913, p. 76, pl. 8, figs. 1-1c.

Richmond (Waynesville): Big Four Railroad, near Weisburg, Indiana.

**Heterotrypa parvulipora** Ulrich and Bassler.

*Heterotrypa parvulipora* Hayes and Ulrich, U. S. Geol. Surv., Folio 95, ill. sheet,  
 1903, fig. 26.—Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p.  
 26, pl. 11, figs. 4-6.—Nickles, Bull. Kentucky Geol. Surv. 5, 1905, p. 45,  
 pl. 1, fig. 12.

Trenton (Catheys): Maury County, etc., Tennessee; Kentucky.

*Cotypes*.—Cat. No. 43186, U.S.N.M.

**Heterotrypa paupera** (Ulrich).

*Dekayia paupera* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 153, pl. 6,  
 figs. 10, 10a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908,  
 p. 817, pl. 15, fig. 3, 3a; pl. 28, fig. 6.

*Heterotrypa paupera* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900,  
 p. 290.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Holotype*.—Cat. No. 43656, U.S.N.M.

**HETEROTRYPA PROLIFICA** Ulrich. See *Heterotrypa subramosa-prolifera*.

**HETEROTRYPA RAMOSA** Nicholson. See *Hallopora ramosa*.

**HETEROTRYPA SINGULARIS** Ulrich. See *Dekayella singularis*.

**Heterotrypa solitaria** Ulrich.

*Heterotrypa solitaria* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 88,  
 pl. 1, figs. 3-3b.

Maysville (Fairmount): Covington, Kentucky; Maury County, Tennessee.

*Holotype*.—Cat. No. 43664, U.S.N.M.

**Heterotrypa subfrondosa** (Cumings).

*Dekayia subfrondosa* Cumings, Amer. Geol., 29, 1902, p. 204, pl. 9, figs. 7, 8 (as *D.*  
*subramosa*); pl. 10, figs. 3, 7, 8; pl. 11, fig. 1; pl. 12, fig. 4; 32d Ann. Rep.  
 Dep. Geol. Nat. Res. Indiana, 1908, p. 821, pl. 14, figs. 6, 6c; pl. 28, fig. 10.

Maysville (Fairmount): Manchester Station, Indiana; Cincinnati, Ohio, and  
 vicinity.



**Heterotrypa subpulchella** (Nicholson).

- Chætetes subpulchellus Nicholson, Pal. Ohio, 2, 1875, p. 196, pl. 21, figs. 6, 6a.  
 Monticulipora (Heterotrypa) subpulchella Nicholson, Genus Monticulipora, 1881, p. 134, fig. 23, pl. 5, figs. 2, 2a.  
 Monticulipora subpulchella James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 181.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 204.  
 Heterotrypa subpulchella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 83.—Nickles, Bull. Kentucky Geol. Surv., no. 5, 1905, p. 51, pl. 2, fig. 12.  
 Dekayia perfrondosa-subpulchella Cumings, Amer. Geol., 29, 1902, p. 211, 212, pl. 9, fig. 14; pl. 10, fig. 4.  
 Dekayia subpulchella Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 822, pl. 16, figs. 1, 1a; pl. 28, fig. 11.  
 Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

**Heterotrypa subramosa** (Ulrich).

- Atactopora subramosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 124, pl. 12, figs. 6-6c.  
 Heterotrypa subramosa Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 290.  
 Dekayia subramosa Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 823, pl. 15, figs. 5, 5b; pl. 29, fig. 2.  
 Richmond (Waynesville): Jacksonburg, Hanover, etc., Ohio; Indiana.  
*Holotype*.—Cat. No. 43663, U.S.N.M.

**Heterotrypa subramosa prolifica** Ulrich.

- Heterotrypa prolifica Ulrich, Geol. Surv. Illinois, 8, 1890, p. 413, pl. 37, figs. 1-1d; Geol. Minnesota, 3, 1893, p. 268.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 145, 146 (p. 579).  
 Monticulipora prolifica J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 75.  
 Heterotrypa subramosa-prolifca Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 290.  
 Dekayella perfrondosa-prolifca Cumings, Amer. Geol., 29, 1902, p. 212 (gen. ref.).  
 Dekayia prolifica Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 820, pl. 15, figs. 4-4b; pl. 29, fig. 3.  
 Richmond: Blanchester, Waynesville, etc., Ohio; Richmond, etc., Indiana; Illinois; Wisconsin; etc.  
*Cotypes*.—Cat. No. 43368, U.S.N.M.

**HETEROTRYPA ULRICHI-INFLECTA** Cumings. See *Heterotrypa inflecta*.

**HETEROTRYPA VAUPELI** Ulrich. See *Nicholsonella vaupeli*.

**HEXAMERES** Barrande. See *Hexameroceras* Hyatt.

**HEXAMEROCERAS** Hyatt.

Genotype: *Phragmoceras panderi* Barrande.

- Hexamoron (Hexameres) Barrande, Syst. Sil. Boheme 2, pt. 1, 1867, pp. 203, 265.  
 Hexameroceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 278.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 242.—Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 478.—Jaekel, Zeits. d. d. geol. Gesell., 54, Protok., 1902, pp. 8, 68, 80.—Jaekel in Ruedemann, Amer. Geol., 31, 1903, p. 200.  
 Hexamoceras Miller, N. A. Geol. Pal., 1st App., 1892, p. 696.

**Hexameroceras cacabiforme** Newell.

Hexameroceras cacabiformis Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 481, figs.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 131, fig.

Hexameroceras cacabiforme Miller, N. A. Geol. Pal., 1st App., 1892, p. 696 (gen. ref.).

Niagaran: Delphi, Indiana.

**Hexameroceras delphicolum** Newell.

Hexameroceras delphicolum Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 479, figs.—Kindle and Breger, 28th Ann. Rep. Dept. Geol. Nat. Res. Indiana, 1904, p. 475.

Hexameroceras delphicolum Miller, N. A. Geol. Pal., 1st App., 1892, p. 696.

Niagaran: Delphi and Huntington, Indiana.

**Hexameroceras hertzeri** (Hall and Whitfield).

Cryptoceras Hertzeri Hall and Whitfield, Geol. Surv. Ohio Pal., 2, 1875, p. 150, pl. 8, figs. 7, 8.

Hexameroceras herzeri Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 130, fig. 1378.

Gomphoceras hertzeri Miller, N. A. Geol. Pal., 1889, p. 437 (gen. ref.).

Hexameroceras hertzeri Miller, N. A. Geol. Pal., 1892, p. 696 (gen. ref.).

Niagaran (Guelph): Cedarville, Ohio.

HEXAMOCERAS Miller. See Hexameroceras Hyatt.

HEXAMORION Barrande. See Hexameroceras Hyatt.

HEXAPORITES Pander. See Dianulites Eichwald.

HEXAPORITES FUNGIFORMIS Leuchtenberg. See Dianulites petropolitana.

**HINDELLA** Davidson.

Genotype: *Athyris umbonata* Billings.

Hindella Davidson, Suppl. British Sil. Brach., Pal. Soc., 1882, p. 130.—Miller, N. A. Geol. Pal., 1889, p. 346.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 63, figs. 46–51; 13th Ann. Rep. New York State Geol., 1895, p. 769.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 148.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 415.

Greenfieldia Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 148. (Genotype: *Hindella whitfieldi* Grabau.)

**Hindella? ambigua** Savage.

Hindella? ambigua Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 89, pl. 4, figs. 17 and 18.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri; Alexander County, Illinois.

HINDELLA PHOCA Ami. See *Lissatrypa phoca*.

**Hindella prinstana** (Billings).

*Athyris Prinstana* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 145, fig. 122 (advance sheets, 1862).

*Meristella prinstana* Miller, N. A. Geol. Pal., 1889, p. 354.

*Hindella prinstana* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 64, pl. 41, fig. 28; pl. 49, fig. 1.

*Athyris turgida* Shaler, Bull. Mus. Comp. Zool., 4, 1865, p. 69.

Gamachian (Ellis Bay) and Anticostian (Becsie River): Prinstana Bay, Ellis Bay, etc., Anticosti.



**Hindella? (Greenfieldia) rostralis** Grabau.

Hindella? (Greenfieldia) rostralis Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 150, pl. 21, figs. 1, 2, 7.

Lower Monroan (Greenfield): Greenfield, Ohio.

**Hindella umbonata** (Billings).

Athyris umbonata Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 144, fig. 121 (adv. sheets, 1862); Geol. Canada, 1863, p. 317, fig. 331.

Hindella umbonata Davidson, Suppl. British Sil. Brach., Pal. Soc., 1882, p. 130, fig.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 64, figs. 46–51; pl. 41, figs. 26, 27, 29, 30.

Meristella umbonata Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 88, pl. 13, fig. 2; Geol. Ohio, 7, 1895, p. 590, pl. 25, fig. 2.

Alexandrian (Ellis Bay) and Anticostian (Beesie River-Gun River): Island of Anticosti.

Upper Medinan (Brassfield): Dayton, Ohio.

**Hindella? (Greenfieldia) whitfieldi** Grabau.

Hindella? (Greenfieldia) whitfieldi Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 149, pl. 19, fig. 4; pl. 21, figs. 11, 17–19; pl. 30, figs. 8–10.

Meristella bella Whitfield (not Hall), Ann. New York Acad. Sci., 5, 1891, p. 510, pl. 5, figs. 8–10; Pal. Ohio, 7, 1893, p. 412, pl. 1, figs. 8–10.—Sherzer, Geol. Surv. Michigan, 7, pt. 1, 1900, p. 223, pl. 17, figs. 8–10.

Lower Monroan (Greenfield): Greenfield, Ohio.

**HINDIA** Duncan.

Genotype: *H. sphæroidalis* Duncan.

Hindia Duncan, Ann. Mag. Nat. Hist. (5), 4, 1879, p. 84.—Hinde, Catalogue Fossil Sponges, British Mus., 1883, p. 57.—Zittel, Neues Jahrb. Min., Geol. Pal., 2, 1884, p. 79.—Rauff, Ann. Mag. Nat. Hist., 5th ser., 18, 1886, p. 169.—Hinde, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 67.—Mon. British Foss. Sponges, Palæontographical Soc., 1888, p. 115.—Miller, N. A. Geol. Pal., 1889, p. 160.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 226.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 56.—Rauff, Palæontographica, 40, 1894, p. 327.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 79.—Koken, Die Leitfossilien, Leipzig, 1896, p. 337; Zittel-Eastman Textb. Pal., 1, 1900, p. 51.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 56.

Microspongia, Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 37.—Ulrich, Amer. Geol., 1, 1888, p. 325.—Miller, N. A. Geol. Pal., 1889, p. 161.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 228.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 54. (Genotype: *M. gregaria* Miller and Dyer.)

Observation.—Although Microspongia has priority it was so poorly defined that its identity with Hindia would not be suspected without study of the types.

**HINDIA FIBROSA** of authors. See *Hindia sphæroidalis*.

**Hindia gregaria** (Miller and Dyer).

Microspongia gregaria Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 37, pl. 2, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 161, fig. 108.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 54.

Astylospongia gregaria James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 247.

Maysville: Cincinnati, Ohio, and vicinity.

**Hindia inæqualis** Ulrich and Everett.

*Hindia inæqualis* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 275, pl. 2, figs. 4, 4a-b.

Black River (Platteville): Near Dixon, Illinois.

Section of *holotype*.—Cat. No. 46561, U.S.N.M.

**Hindia parva** Ulrich.

*Hindia parva* Ulrich, Amer. Geol., 3, 1889, p. 244.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 79, pl. G, figs. 7-9.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 135, pl. 6, fig. 1.

*Hindia sphaeroidalis* var. *parva* Rauff, Palæontographica, 40, 1894, p. 338, pl. 15, fig. 2.

*Microspongia parva* Miller, N. A. Geol. Pal., 1889, p. 161 (gen. ref.).

*Microspongia gregaria* (part) James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 54.

Trenton: Danville, Frankfort, etc., Kentucky; Tennessee; New Jersey; Wisconsin; Minnesota; etc.

Black River (Decorah): Minneapolis, etc., Minnesota.

*Cotypes*.—Cat. No. 46562, U.S.N.M.

**Hindia sphaeroidalis** Duncan.

*Calamopora fibrosa* Roemer (not Goldfuss), Sil. Fauna West Tennessee, 1860, p. 20, pl. 2, fig. 9.

*Hindia fibrosa* Hinde, Cat. Foss. Sponges British Mus., 1883, p. 57, pl. 13, figs. 1, 1a-b.—Roemer, Lith. Errat. in Pal. Abhandl. Dames u. Kayser, 2, 1885, p. 63 (310), pl. 4 (27), fig. 17.—Rauff, Sitzungsber. d. Niederrh. Gesell. für Nat. und Heilk. zu Bonn, Sitz., 1886, pp. 166-172.—Hinde, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 76, figs. 1, 2; Mon. British Foss. Sponges, Pal. Soc., 1888, p. 116.—Girty, 48th Rep. New York State Mus., 2, 1895 (1897), p. 263; 14th Rep. State Geol. New York for 1894, 1897, p. 263, pl. 2, fig. 2.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 297, pl. 33, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.

*Hindia sphaeroidalis* Duncan, Ann. Mag. Nat. Hist., 5th ser., 4, 1879, p. 91, pl. 9, figs. 1-6.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 224, figs. 9, 10, pp. 225, 227—Rauff, Palæontographica, 40, 1894, p. 335, pl. 15; pl. 16; pl. 17; figs. 1-4.—Girty, 48th Rep. New York State Mus., 2, 1895 (1897), pl. 2, fig. 2; 14th Rep. State Geol. New York for 1894, 1897, pl. 2, fig. 2; 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 552.—Foerste, Jour. Geol., 11, 1903, p. 714.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 195, pl. 17, figs. 1-4.

*Hyalostelia solivaga* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 232, pl. 2, fig. 4c.

*Astylospongia inornata* Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 70.

*Sphaerolithes nicholsoni* Hinde, Abstract Proc. Geol. Soc., No. 305, 1875, p. 88, in Quart. Jour. Geol. Soc., 31.

Silurian and Early Devonian: Many localities in the United States and Canada.

*Plesiotype*.—Cat. No. 46563, U.S.N.M. (*holotype* of *Hyalostelia solivaga*).

**HINDIA SPHÆROIDALIS** var. **PARVA** Rauff. See *Hindia parva*.

**Hindia subrotunda** (James).

*Chætetes subrotundus* James, Paleontologist, No. 2, 1878, p. 11.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 31.

*Astylospongia subrotundus* James, Paleontologist, 5, 1881, p. 34.

*Microspongia?* *subrotundus* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 55, fig. 1.

Richmond: Clinton County, Ohio.



*HIPPARIONYX CONSIMILARIS* Vanuxem. See *Atrypa reticularis*.

*HIPPOTHOA DELICATULA* James. See *Corynotrypa delicatula*.

*HIPPOTHOA INFLATA* Nicholson. See *Corynotrypa inflata*.

**HOLASAPHUS** Matthew.

Genotype: *H. centropyge* Matthew.

*Holasaphus* Matthew, Trans. Roy. Soc. Canada, 2d ser., 1, sec. 4, 1895, p. 268  
Geol. Surv. Canada, Rep. Cambrian Rocks, Cape Breton, 1903, p. 174.

**Holasaphus congeneris** (Walcott).

*Bathyurus?* *congeneris* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 92, pl. 12, fig. 8.  
Upper Pogonip: Ridge southwest of Wood Cove, Eureka District, Nevada.  
*Cotype*.—Cat. No. 24654, U.S.N.M.

**Holasaphus moorei** Raymond.

*Holasaphus moorei* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 35, pl. 3,  
figs. 7-11.  
Canadian (Beekmantown): St. Anne de Bellevue, Island of Montreal, Quebec.

*HOLOCYSTIS* Haeckel. See *Holocystites* Hall.

**HOLOCYSTITES** Hall.

Genotype: *Caryocystites cylindricus* Hall.

*Holocystites* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1864),  
p. 311, 380; rev. ed., pp. 353, 429.—Miller, Jour. Cincinnati Soc. Nat.  
Hist., 1, Oct., 1878, p. 129.—Zittel, Handb. Pal., 1, 1879, p. 416.—Miller, N.  
A. Geol. Pal., 1889, p. 253.—Bather, Treatise on Zool., pt. 3, Echinoderma,  
London, 1900, p. 72; Zittel-Eastman Textb. Pal., 1, 1900, p. 183.—Zittel,  
Grundzuge Pal., 1, 1910, p. 91.—Grabau and Shimer, N. A. Index Fossils, 2,  
1910, p. 460.

*Holocystis* (not Lonsdale, 1855) Haeckel, Amphorideen u. Cystoideen, Leipzig,  
1896, p. 60.

*Megacystites* Hall, Addenda 20th Rep. New York State Cab. Nat. Hist., 1867,  
p. 380. (New name, in case *Holocystites* be thought to be too much like  
*Holocystis*.)—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 47.

*Megacystis* Angelin, Icon. Crinoid., 1878, p. 29.

**Holocystites abnormis** Hall.

*Holocystites abnormis* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras,  
1864), 1868, p. 312, pl. 12(3), figs. 7, 8; rev. ed., p. 355, pl. 12, figs. 7, 8.—  
Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.

Niagaran (Racine): Racine, Wisconsin.

**Holocystites adipatus** Miller.

*Holocystites adipatus* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1898,  
p. 623, pl. 2, figs. 1, 2. (Adv. sheets, 1891, p. 13.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites affinis** Miller and Faber.

*Holocystites affinis* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 15, 1892,  
p. 87, pl. 1, figs. 16-18.

Clinton (Osgood): Near Madison, Indiana.

**Holocystites alternatus** (Hall).

*Caryocystites alternatum* Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 23;  
Geol. Wisconsin, 1, 1862, p. 69.

**Holocystites alternatus**—Continued.

*Holocystites alternatus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1864), p. 312, pl. 12(3), fig. 9; pl. 12a(1), fig. 6; rev. ed., 1870, p. 355, pl. 12, fig. 9, pl. 12a, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 461, fig. 1767.

*Holocystis alternata* Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, pl. 2, fig. 28.

Niagaran (Racine): Racine, Wisconsin.

**Holocystites amplus** Miller.

*Holocystites amplus* Miller, 18th Rep. Dep. Geol. Nat. Res., Indiana, 1894, p. 262, pl. 2, fig. 1. (Adv. sheets, 1892, p. 8, pl. 2, fig. 1.)

Clinton (Osgood): Near Madison, Indiana.

**Holocystites asper** Miller and Gurley.

*Holocystites asper* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 84, pl. 5, figs. 1, 2.

Clinton (Osgood): Near Madison, Indiana.

**Holocystites baculus** Miller.

*Holocystites baculus* Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 105, pl. 10, figs. 5, 5a.

Clinton (Osgood): Ripley County, Indiana.

**Holocystites benedicti** Miller.

*Holocystites benedicti* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 627, pl. 5, fig. 3. (Adv. sheets, 1891.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites brauni** Miller.

*Holocystites brauni* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 130.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites canneus** Miller.

*Holocystites canneus* Miller, N. A. Geol. Pal., 1889, p. 253, figs. 332, 333.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites colletti** Miller.

*Holocystites colletti* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 626, pl. 4, fig. 3. (Adv. sheets, 1891, p. 16.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites commodus** Miller.

*Holocystites commodus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 624, pl. 3, figs. 1, 2, 5, 6. (Adv. sheets, 1891, p. 14.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites cylindricus** (Hall).

*Caryocystites cylindricum* Hall, Geol. Surv. Wisconsin, Rep. Progr., 1861, p. 23; Geol. Wisconsin, 1, 1862, p. 69.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 91.

*Holocystites cylindricus* Hall, Adv. Pub., 18th Rep. New York State Cab. Nat. Hist., 1864, p. 7, pl. 1, fig. 7, 8; pl. 3, figs. 4–6; 20th Rep. New York State Cab. Nat. Hist., Doc. Ed., 1868, p. 311, pl. 12, figs. 4–6; pl. 12a, figs. 7–8; rev. ed., 1870, p. 354.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 461, fig. 1766.

*Holocystis cylindrica* Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 60. Niagaran (Racine): Racine, Wisconsin.



**Holocystites dyeri** Miller.

*Holocystites dyeri* Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 108, pl. 10, fig. 3.

Clinton (Osgood): Ripley County, Indiana.

**Holocystites elegans** Miller.

*Holocystites elegans* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 136, pl. 16, figs. 2, 3a.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites faberi** Miller.

*Holocystites faberi* Miller, N. A. Geol. Pal., 1889, p. 254, figs. 334, 335.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites globosus** Miller.

*Holocystites globosus* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 134, pl. 5, figs. 5, 5a, 5b.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites gorbyi** Miller.

*Holocystites gorbyi* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 624, pl. 2, figs. 3, 4. (Adv. sheets, 1891, p. 14.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites gyrinus** Miller and Gurley.

*Holocystites gyrinus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 5, pl. 1, figs. 1-3.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 747, fig. 1361.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 72, fig. 42.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites hammelli** Miller. See *Trematocystis hammelli*.**Holocystites indianensis** Miller.

*Holocystites indianensis* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 625, pl. 3, fig. 7. (Adv. sheets, 1891, p. 15.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites jolietensis** Miller.

*Holocystites jolietensis* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 223, pl. 9, figs. 1, 1a.

Niagaran (Racine): Joliet, Illinois.

**Holocystites madisonensis** Miller.

*Holocystites madisonensis* Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 625, pl. 3, figs. 3, 4. (Adv. sheets, 1891, p. 15.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites ornatissimus** Miller.

*Holocystites ornatissimus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 627, pl. 5, figs. 1, 2. (Adv. sheets, 1891, p. 15.)

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites ornatus** Miller.

*Holocystites ornatus* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 132, pl. 5, figs. 3, 3a, 3b.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites ovatus** Hall.

*Holocystites ovatus* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 313, pl. 12 (3), fig. 3; rev. ed., 1870, p. 357, pl. 12, fig. 2.—Chamberlin, Geol. Wisconsin, 1883, 1, p. 191, fig.  
Niagaran (Racine): Waukesha, Wisconsin.

**Holocystites papulosus** Miller.

*Holocystites papulosus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 628, pl. 5, figs. 7, 8 (adv. sheets 1891, p. 18.—Rowley in Greene's Cont. Indiana Pal., 16, 1903, p. 166, pl. 48, figs. 16-18.  
Clinton (Osgood): Jefferson County, Indiana.

**Holocystites parvulus** Miller.

*Holocystites parvulus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 628, pl. 5, fig. 6 (adv. sheets 1891, p. 18).  
Clinton (Osgood): Jefferson County, Indiana.

**Holocystites parvus** Miller.

*Holocystites parvus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 626, pl. 4, figs. 4, 5 (adv. sheets 1891, p. 16).  
Clinton (Osgood): Jefferson County, Indiana.

**Holocystites perlongus** Miller.

*Holocystites perlongus* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 132, pl. 5, figs. 4, 4a.  
Clinton (Osgood): Ripley County, Indiana.

**Holocystites plenus** Miller.

*Holocystites plenus* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 135, pl. 6, figs. 2, 2a.  
Clinton (Osgood): Jefferson County, Indiana.

**Holocystites pustulosus** Miller.

*Holocystites pustulosus* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 134, pl. 6, figs. 1, 1a.  
Niagaran (Laurel): Near Waldron, Indiana.

**Holocystites rotundus** Miller.

*Holocystites rotundus* Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 107, pl. 9, figs. 3, 3a, 3b.  
Clinton (Osgood): Ripley County, Indiana.

**Holocystites scitulus** Miller.

*Holocystites scitulus* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 624, pl. 2, figs. 5, 6 (adv. sheets 1891, p. 14); N. A. Geol. Pal., 2d. App., 1897, p. 747, fig. 1359.  
Clinton (Osgood): Jefferson County, Indiana.

**Holocystites scutellatus** Hall.

*Holocystites scutellatus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras Dec. 1864), p. 314, pl. 12 (3), fig. 1; rev. ed. 1870, p. 357, pl. 12, fig. 1.  
Niagaran (Racine): Waukesha, Wisconsin.

**Holocystites spangleri** Miller.

*Holocystites spangleri* Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 626, pl. 4, fig. 6 (adv. sheets 1891, p. 16).  
Clinton (Osgood): Jefferson County, Indiana.



**Holocystites sphæricus** Winchell and Marcy.

Holocystites sphæricus Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 111.

Niagaran (Racine): Chicago, Illinois.

**Holocystites sphæroidalis** Miller and Gurley.

Holocystites sphæroidalis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 85, pl. 5, figs. 3, 4.

Clinton (Osgood): Near Madison, Indiana.

**Holocystites splendens** Miller and Gurley.

Holocystites splendens Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 7, pl. 1, figs. 7, 9.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 747, fig. 1360.

Clinton (Osgood): Near Madison, Indiana.

**Holocystites subglobosus** Miller. See Trematocystis subglobosus.

**Holocystites subovatus** Miller.

Holocystites subovatus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 627, pl. 5, figs. 4, 5 (adv. sheets 1891, p. 17); N. A. Geol. Pal., 1st App., 1892, p. 680, fig. 1237.

Clinton (Osgood): Jefferson County, Indiana.

**Holocystites subrotundus** Miller.

Holocystites subrotundus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 107, pl. 9, figs. 2, 2a.

Clinton (Osgood): Ripley, Indiana.

**Holocystites tumidus** Miller.

Holocystites tumidus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 104, pl. 9, figs. 1, 1a.

Clinton (Osgood): Ripley, Indiana.

**Holocystites turbinatus** Miller.

Holocystites turbinatus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 259, pl. 15, figs. 7, 7a; N. A. Geol. Pal., 1889, p. 255, fig. 339.

Clinton (Osgood): Ripley County, Indiana.

**Holocystites ventricosus** Miller.

Holocystites ventricosus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 108, pl. 10, fig. 4.

Clinton (Osgood): Ripley County, Indiana.

**Holocystites wetherbyi** Miller.

Holocystites wetherbyi Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 131, pl. 5, figs. 2, 2a, 2b.

Clinton (Osgood): Ripley County, Indiana.

**Holocystites winchelli** Hall.

Holocystites winchelli Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1864), p. 313, pl. 12 (3), fig. 3; rev. ed., 1870, p. 356, pl. 12, fig. 3.

Niagaran (Racine): Waukesha, Wisconsin.

**Holocystites wykoffi** Miller.

Holocystites wykoffi Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 625, pl. 4, figs. 1, 2 (Adv. sheets, 1891, p. 15).

Clinton (Osgood): Jefferson County, Indiana.

**HOLOGRAPTUS** Holm.Genotype: *H. expansum* Holm.

*Holograptus* Holm, Ofver. K. Vet. Akad. Forhandl. 38, No. 9, 1881, p. 45.—Hermann, Geol. Mag., dec. 3, 3, 1886, p. 20.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 265.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1902, p. 74.

*Rouvilligraptus Barrois*, Ann. Soc. Geol. du Nord, 21, Lille, 1893, p. 109.

**Holograptus richardsoni** (Hall).

*Graptolithus Richardsoni* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 107, pl. 12, figs. 1-8.

*Graptolithus* (*Monoprion*) *richardsoni* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226, pl. 3, fig. 30; rev. ed. (1870), p. 261, pl. 3, fig. 30; p. 223.

*Holograptus?* *richardsoni* Gurley, Jour. Geol., 4, 1896, p. 99 (gen. ref.).

*Rouvilligraptus Richardsoni* Barrois, Ann. Soc. Geol. du Nord., 21, Lille, 1893, p. 109, pls. 3, 4.

*Clonograptus Richardsoni* Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 51 (gen. ref.).

Canadian (Levis, *Clonograptus* zone): Three miles above River Ste. Anne, Quebec.

**HOLOMETOPUS** Angelin.Genotype: *H. limbatus* Angelin.

*Holometopus* Angelin, Pal. Scandinavica, 3d ed., Holmia, 1878, p. 58.—Zittel, Handb. Pal., 2, 1885, p. 602.—Miller, N. A. Geol. Pal., 1889, p. 550.—Pompeckj, Beit. Phys.-Oekon. Gesell., Königsberg, 1890, p. 86.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 182.

**Holometopus angelini** Billings.

*Holometopus Angelini* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 95, fig. 85a, b; p. 281.—Miller, N. A. Geol. Pal., 1889, p. 550, fig. 1013.

Canadian: Point Levis, Quebec (*Levis*, *Diplograptus dentatus* zone); Table Head, Pistclet Bay, four miles north Portland Creek and Cow Head, Newfoundland (Quebec, N. P.).

**HOLOPEA** Hall.Genotype: *H. symmetrica* Hall

*Holopea* Hall, Pal. New York, 1, 1847, p. 169.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 346; *ibid.*, 2d ed., 1881, p. 553; Cat. Camb. and Sil. Foss., 1873, p. 69.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 119.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 187.—Zittel, Handb. Pal., 2, 1882, p. 188.—Miller, N. A. Geol. Pal., 1889, p. 405.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 423; Die Leitfossilien, Leipzig, 1896, p. 400; Bull. de l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 193.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1064.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676.

**HOLOPEA** Whitfield (part). See *Plethospira* Ulrich.

**Holopea ampla** Ulrich and Scofield.

*Holopea ampla* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1065, pl. 79, figs. 22-25.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676, fig. 941.

Black River (Platteville): Cannon Falls, Minnesota; Mineral Point and Beloit, Wisconsin.

*Cotype*.—Cat. No. 45837, U.S.N.M.

84243°—Bull. 92—15—40



**Holopea antiqua** (Vanuxem).

Littorina antiqua Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 112, fig. 4.—Hall, *ibid.*, 4, 1843, p. 142, fig. 4; tab. ill. 26, fig. 4.—Mather, *ibid.*, 1, 1843, p. 349, fig. 4.—Owen, Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 47, fig. 4.—Emmons, Man. Geol., 1860, p. 133, fig. 102.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 58, pl. 9, fig. 4.

Holopea antiqua Hall, Pal. New York, 3, 1859, p. 294, pl. 54, figs. 2a-b, 3a-b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 283, fig.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 264, pl. 24, figs. 15, 16.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 677, fig. 944.

Manlius or Keyser: Schoharie, Litchfield, etc., New York; New Jersey.

**Holopea antiqua pervetusta** Hall.

Holopea antiqua var. pervetusta Hall, Pal. New York, 3, 1859, p. 295, pl. 54, figs. 4, 5.—Grabau, Michigan, Geol. Surv., Geol. Ser., 1, 1909, p. 178, pl. 28, figs. 4-5.

Holopea pervetusta Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 677, fig. 945.

Helderbergian (Manlius or Keyser): New York.

Upper Monroan (Amherstburg): Detroit River region, Michigan.

**Holopea appressa** Ulrich and Scofield.

Holopea appressa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1065, pl. 79, figs. 7-10.

Trenton: Goodhue County, Minnesota (Prosser); Burgin, Kentucky.

Cotypes.—Cat. No. 45838, U.S.N.M.

**Holopea arctica** Schuchert.

Holopea arctica Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 168, pl. 12, figs. 14-16.

Mohawkian: Head of Frobisher Bay, Baffin Land.

Cotypes.—Cat. No. 28190, U.S.N.M.

**HOLOPEA ARENARIA** Whitfield. See *Plethospira arenaria*.

**HOLOPEA CASSINA** Whitfield. See *Plethospira cassina*.

**Holopea chicagoensis** Winchell and Marcy.

Holopea chicagoensis Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 99, pl. 2, fig. 18.

Niagaran (Racine): Chicago, Illinois.

**Holopea concinnula** Ulrich and Scofield.

Holopea concinnula Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1066, pl. 79, fig. 6.

Black River (Platteville): Beloit, Wisconsin.

Platotype.—Cat. No. 46531, U.S.N.M.

**Holopea conoidea** (Hall).

Murchisonia? conoidea Hall, Pal. New York, 2, 1852, p. 13, pl. 4, fig. 7.

Holopea conoidea Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 2, 1899, p. 164 (gen ref.).

Upper Medinan: Lockport, New York.

**Holopea dilucula** (Hall).

Turbo dilucula Hall, Pal. New York, 1, 1847, p. 12, pl. 3, fig. 7.—Cleland, Bull. Amer. Pal., 4, 1903, p. 14.

Holopea dilucula Miller, N. A. Geol. Pal., 1889, p. 405, fig. 678.

Ozarkian (Little Falls): Little Falls, etc., New York.

**Holopea? elongata** Hall.

*Holopea? elongata* Hall, Pal. New York, 3, 1859, p. 295, pl. 54, figs. 6, 7.

Cayugan (Manlius): Schoharie, Manlius, etc., New York.

**Holopea excelsa** Ulrich and Scofield.

*Holopea excelsa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1067, pl. 79, figs. 11 and 12.

Trenton (Prosser): Wykoff, Sumner, and Hader, Minnesota.

*Cotypes*.—Cat. No. 45839, U.S.N.M.

**Holopea gracia** Billings.

*Holopea Gracia* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 159 (adv. sheets, 1862).—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 72, pl. 3, fig. 17; Quart. Jour. Geol. Soc. London, 31, 1875, p. 549, pl. 26, fig. 17.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 18, pl. 3, fig. 4; *ibid.*, 3, pt. 2, 1895, p. 95, pl. 14, fig. 3.

Niagaran (Guelph): Galt, Ontario.

**Holopea grandis** Calvin.

*Holopea grandis* Calvin, Bull. Lab. Nat. Hist. State Univ. Iowa, 1, 1890, p. 177, pl. 3, figs. 1a-b.

Niagaran: Monmouth, Iowa.

**Holopea guelphensis** Billings.

*Holopea Guelphensis* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 343, fig. 351; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 159 (adv. sheets, 1862), fig. 143.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 343, pl. 15 (6), fig. 18 (extras, 1865); rev. ed., 1870, p. 391, pl. 15, fig. 18.—Nicholson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 549, pl. 26, fig. 18; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 72, pl. 3, fig. 18.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 95.

Niagaran (Guelph): Galt, etc., Ontario; Wisconsin.

**Holopea harmonia** Billings.

*Holopea harmonia* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 168, fig. 142 (adv. sheets, 1862).—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 342, rev. ed., 1868 (1870), p. 391.—Koken, Neues Jahrb. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 423.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 94.

Niagaran (Guelph): Galt, etc., Ontario; Wisconsin.

**Holopea harpa** (Hudson).

*Straparollina harpa* Hudson, Bull. New York State Mus., 80, 1905, p. 292, pl. 5, figs. 4, 5.

*Holopea harpa* Raymond, Ann. Carnegie Mus., 4, 1908, p. 212, pl. 53, fig. 13; pl. 55, figs. 16, 17.

Chazy (Valcour): Valcour Island, New York.

**Holopea hubbardi** Miller.

*Holopea hubbardi* Miller, N. A. Geol. Pal., 1st App., 1892, p. 694, fig. 1255; 18th Ann. Rep. Indiana Dep. Geol. Nat. Res., p. 318, pl. 9, figs. 39, 40 (adv. sheets 1892).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 964, pl. 40, figs. 11, 11a.

Richmond (Whitewater-Saluda): Madison, Indiana.

**HOLOPEA HUDSONI** Raymond. See *Trochonema hudsoni*.



**Holopea incerta** Foerste.

*Holopea incerta* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 139, pl. 1, fig. 4.

Trenton (Upper): Near Rogers Gap, Kentucky.

**Holopea insignis** Ulrich and Scofield.

*Holopea insignis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1065, pl. 79, figs. 1-5.

Black River: Minneapolis, Cannon Falls, and Faribault, Minnesota (Platteville); Lincoln County, Missouri (Auburn).

*Cotypes*.—Cat. Nos. 45840, 45841, U.S.N.M.

**Holopea lavinia** Billings.

*Holopea Lavinia* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 28 (adv. sheets 1862).

Trenton: Township of Admaston, Canada.

**Holopea leiosoma** Billings.

*Holopea leiosoma* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 187, fig. 168. Ozarkian? (Levis—erratic): Point Levis, Quebec.

**Holopea magniventra** Whitfield.

*Holopea magniventra* Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 83; Geol. Wisconsin, 4, 1882, p. 316, pl. 24, figs. 2, 3.

Niagaran (Guelph): Carlton, Wisconsin.

**Holopea medioeris** (Billings).

*Cyclonema medioeris* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 56.

Anticostian (Jupiter River): Four miles west of Southwest Point, Anticosti.

**HOLOPEA MICROCLATHRATA** Hudson. See *Gyronema microclathratum*.

**Holopea minuta** Savage.

*Holopea minuta* Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 102, pl. 5, fig. 30. Upper Medinan (Edgewood): Near Edgewood, Missouri.

**HOLOPEA NANA** Meek. See *Cyclora minuta*.

**Holopea nashvillensis** Ulrich.

*Holopea nashvillensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1068.

Trenton (Catheys): Nashville, Tennessee.

*Holotype*.—Cat. No. 45842, U.S.N.M.

**Holopea nereis** Billings.

*Holopea Nereis* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 27 (adv. sheets 1862).

Black River (Leray): Pauquettes Rapids, Ottawa River, near L'Original, Ottawa, and Island of Montreal, Canada.

**Holopea niagarensis** Winchell and Marcy.

*Holopea niagarensis* Winchell and Marcy, Mem. Boston, Soc. Nat. Hist., 1, 1865, p. 99, pl. 2, fig. 17.

Niagaran (Racine): Chicago, Illinois.

**HOLOPEA OBESA** Whitfield. See *Sinuopea obesa*.

**Holopea obliqua** Hall.

*Holopea obliqua* Hall, Pal. New York, 1, 1847, p. 170, pl. 37, figs. 2a-d.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 283, fig.

**Holopea obliqua**—Continued.

*Holopea* cf. *obliqua* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 74, pl. 3, fig. 5.

*Turbo obliquus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 5, fig. 8; Man. Geol., 1860, p. 98, fig. 87.

Trenton: Middleville and Watertown, New York.

? St. Peter sandstone; Minnesota.

**Holopea obscura** (Hall).

*Turbo*? *obscura* Hall, Pal. New York, 1, 1847, p. 12, pl. 3, fig. 8 (sup. 315).

*Holopea obscura* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 537 (gen. ref.).

Canadian (Beekmantown): Fort Plain, New York.

**Holopea obsoleta** (Hall).

*Cyclonema*? *obsoleta* Hall, Pal. New York, 2, 1852, p. 90, pl. 28, figs. 3a, b.

*Holopea obsoleta* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 348 (gen. ref.).

Lower Clinton: Medina and Lockport, New York.

**Holopea obsoleta elevata** Foerste.

*Holopea obsoleta* var. *elevata* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 290, pl. 6, fig. 17.

Clinton: Cumberland Gap, Tennessee.

**Holopea? occidentalis** Nicholson.

*Holopea? occidentalis* Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 85, fig.; Quart. Jour. Geol. Soc. London, 31, 1875, p. 550, 551, fig.—Whiteaves, Pal.

Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 95.

Niagaran (Guelph): Elora, Ontario.

**Holopea ophelia** Billings.

*Holopea Ophelia* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 222, fig. 204. Chazyan. (Quebec-L): Point Rich, Newfoundland.

**Holopea ovalis** Billings.

*Holopea ovalis* Billings, Canadian Nat. Geol., 4, 1859, p. 351, fig. 2.

Canadian (Beekmantown): Second Concession of Godmanchester, Canada.

**Holopea oxfordensis** Ulrich.

*Holopea oxfordensis* Ulrich, Geol. Minnesota, 3, 1897, pt. 2, p. 1068.

Richmond (Whitewater): Oxford, Ohio.

*Cotypes*.—Cat. Nos. 45843, 45844, U.S.N.M.

**Holopea paludiniiformis** Hall.

*Holopea paludiniiformis* Hall, Pal. New York, 1, 1847, p. 171, pl. 37, figs. 3a, 3b.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 2.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 284, figs.—Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 75.—Ulrich and Scofield, Geol.

Minnesota, 3, pt. 2, 1897, p. 1067.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 35.

*Turbo americanus* D'Orbigny, Prodr. de Pal., 1, 1849, p. 6.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 6, fig. 20.

Trenton: Watertown, New York; near Cannon Falls, Minnesota (Prosser).

? St. Peter sandstone; Minnesota.



**Holopea parvula** Ulrich.

*Holopea parvula* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1067, pl. 79, fig. 19.—

Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 187, pl. 12, fig. 30.

Trenton: Near Burgin, Kentucky (Flanagan); Jacksonburg, New Jersey.

*Holotype*.—Cat. No. 45845, U.S.N.M.

**HOLOPEA PERUNDOSA** Sardeson. See *Holopea pyrene*.

**HOLOPEA PERVETUSTA** Grabau and Shimer. See *Holopea antiqua pervetusta*.

**Holopea? plauta** Raymond.

*Holopea? plauta* Raymond, Ann. Carnegie Mus., 3, 1906, p. 577; *ibid.*, 4, 1908, p. 214, pl. 54, fig. 9.

Chazy (Crown Point): Valcour Island and Chazy, New York.

**Holopea proserpina** Billings.

*Holopea Proserpina* Billings, Pal. Foss., 1 Geol. Surv. Canada, 1865, p. 28. (Adv. sheets, 1862.)

Canadian (Beekmantown): Phillipsburg, Quebec.

**Holopea pyrene** Billings.

*Holopea Pyrene* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 145, fig. 91;

Pal. Foss., 1, Geol. Surv. Canada, p. 27, fig. 26. (Adv. sheets, 1862.)—

Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 423.—

Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1067, pl. 79, figs. 13–18.—Grabau, Amer. Nat., 36, 1902, p. 925.

*Holopea(?) perundosa* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 336, pl. 6, figs. 12, 13; p. 343.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

Trenton (Prosser): Near Cannon Falls, Minnesota.

*Plesiotypes*.—Cat. No. 45846, U.S.N.M.

**Holopea? raymondia** Cleland.

*Holopea(?) raymondia* Cleland, Bull. Amer. Pal., 4, 1903, p. 15, pl. 3, figs. 13, 14.

Ozarkian (Little Falls): Little Falls, New York.

**Holopea reversa** Hall.

*Holopea reversa* Hall, Canadian Nat. Geol., 5, 1860, p. 154, fig. 14.

Silurian: Arisaig, Nova Scotia.

**Holopea rotunda** Ulrich and Scofield.

*Holopea rotunda* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1066, pl. 79, figs. 20, 21.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676, fig. 942.

Black River (Platteville): Dixon, Illinois.

Trenton: Hartsville, Tennessee.

*Cotypes*.—Cat. Nos. 45847, 45848, U.S.N.M.

**Holopea scrutator** Raymond.

*Holopea scrutator* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 379; Ann. Carnegie Mus., 4, 1908, p. 212, pl. 54, figs. 7, 8.

Chazy: Valcour Island and Chazy, New York (Day Point, Crown Point); East Tennessee (Lenoir).

**Holopea similis** Ulrich and Scofield.

*Holopea similis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1066, pl. 79, fig. 26.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676, fig. 942.

**Holopea similis**—Continued.

Black River (Decorah): Minneapolis and St. Paul, and Goodhue and Fillmore Counties, Minnesota.

Trenton (Prosser): Near Cannon Falls, Minnesota.

?Maysville: Covington, Kentucky.

**Holopea subconica** Hall.

*Holopea subconica* Hall, Pal. New York, 3, 1859, p. 294, pl. 54, figs. 1a, 1b.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 177.

Cayugan (Manlius): Near Auburn, Cayuga County, New York.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

**Holopea supraplana** Ulrich and Scofield.

*Holopea supraplana* Ulrich and Scofield, Geol. Minnesota, 3, 1897, pt. 2, p. 1068, pl. 79, figs. 27, 28.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 187, pl. 12, figs. 31, 32.

Trenton: Kenyon, Minnesota (Prosser); Jacksonburg, New Jersey.

*Cotypes*.—Cat. No. 45849, U.S.N.M.

**Holopea symmetrica** Hall.

*Holopea symmetrica* Hall, Pal. New York, 1, 1847, p. 170, pl. 37, fig. 1.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 186, pl. 12, figs. 26, 27.

*Turbo symmetricus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 5, fig. 17.

Trenton: Middleville, New York; Jacksonburg, New Jersey.

**HOLOPEA TEXTILIS** Grabau and Shimer. See *Strophostylus textilis*.

**HOLOPEA TURGIDA** Billings. See *Sinuopea turgida*.

**Holopea ventricosa** Hall.

*Holopea ventricosa* Hall, Pal. New York, 1, 1847, p. 171, pl. 37, figs. 4a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 284, figs.

*Turbo ventricosus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 6, fig. 19a, b.

Trenton: Middleville, New York.

**Holopea? voluta** Cleland.

*Holopea(?) voluta* Cleland, Bull. Amer. Pal., 4, 1903, p. 14, pl. 3, fig. 12.

Ozarkian (Little Falls): Little Falls, New York.

**HOLOPELLA? SUBULATA** Foerste. See *Hormotoma subulata*.

**HOMALONOTUS** Koenig.

Genotype: *H. knighti* Koenig.

*Homalonotus* Koenig, Icones Foss. Sectiles, 1825, p. 7.—Murchison, Sil. Syst., 1839, p. 651.—Edwards, Hist. Nat. d. Crust., 3, 1840, p. 314.—Bronn, Neues Jahrb. f. Min., etc., 1840, pp. 445, 451.—Goldfuss, *ibid.*, 1843, pp. 541, 559.—Castelnau, Essai Syst. Sil. l'Amerique Septent, 1843, p. 20.—Burmeister, Org. der. Tril., Berlin, 1843, p. 99.—Emmrich, Neues Jahrb. f. Min., etc., 1845, p. 43.—Hawle and Corda, Abh. d. k. bohmischen Gesell. d. Wiss., 5 (Extract), 1847, p. 89, pl. 5, fig. 51.—McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 399.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 778; Syst. Sil. du Centre Boheme, 1, 1852, p. 577, pls. 29, 34.—Roemer, Neues Jahrb. f. Min., etc., 1853, p. 581.—McCoy, British Pal. Rocks Fossils, 1854, p. 167.—Pictet, Traite de Pal., 2d ed., 1854, p. 504.—Chapman, Canadian Jour., n. s., 1, 1856, p. 272; *ibid.*, 8, 1863, p. 32; Expos. Min. Geol. Canada, 1864, p. 140.—Salter, Mon. British Tril., Pal. Soc., 1865, p. 103; Cat. Camb. Sil. Foss., 1873, p. 133.—Angelin, Pal. Scandinavica, 3d ed., 1878, p. 29.—Zittel, Handb. Pal., 2, 1885, p. 604.—Hall and Clarke, Pal. New York, 7, 1888, pp. 23, 24, fig.—Miller, N. A.



**HOMALONOTUS**—Continued.

Geol. Pal., 1889, p. 550.—Koken, Die Leitfossilien, Leipzig, 1896, p. 23, fig. 14, figs. 4-6.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 312; *ibid.*, 7, 1901, p. 221.—Beecher, Zittel-Eastman Textb. Pal., 1, 1900, p. 635.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 57.—Grabau, Bull. New York State Mus., 45, 1901, p. 221.—Woodward, Geol. Mag., dec. 4, 10, 1903, p. 20.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 316.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724.

Trimerus Green, Tril. North America, 1832, p. 81.—Salter, Mon. British Tril., Pal. Soc., 1865, p. 104.—Zittel, Handb. Pal., 2, 1885, p. 605.—Koken, Die Leitfossilien, Leipzig, 1896, p. 23.—Clarke, Arch. Mus. Nac. Rio de Janeiro, 9, 1890, p. 10, footnote.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724.

Dipleura Green, Mon. Tril. North America, 1832, p. 78.—Salter, Mon. British Tril., Pal. Soc., 1865, p. 105.—Zittel, Handb. Pal., 2, 1885, p. 605.—Koken, Die Leitfossilien, Leipzig, 1896, p. 23.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 105, pl. 3, fig. 27.—Clarke, Arch. Mus. Nac. Rio de Janeiro, 9, 1890, p. 10, footnote.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724.

Brongniartia Eaton, Geol. Textb., 1832, p. 32, pl. 2, fig. 20; Amer. Jour. Sci., 22, 1832, p. 165.—Edwards, Hist. Nat. d. Crust., 3, 1840, p. 346.—Salter, Mon. British Tril., Pal. Soc., 1865, p. 104.—Zittel, Handb. Pal., 3, 1885, p. 605.—Koken, Die Leitfossilien, Leipzig, 1896, p. 23.

Brongniatia Green, Mon. Tril. North America, 1832, p. 90.

**HOMALONOTUS ATLAS** Castelnau. See *Homalonotus delphinocephalus*.

**Homalonotus? bistrami** Hoek.

*Homalonotus bistrami* Hoek, Neues Jahrb. Min., Geol. Pal., 34, 1912, p. 249, pl. 8, figs. 19, 20.

Ordovician: Cochabamba, Bolivia.

**Homalonotus dawsoni** Hall.

*Homalonotus dawsoni* Hall, Canadian Nat. Geol., 5, 1860, p. 155, fig. 17.—Dawson, Acad. Geol., 2d ed., 1868, p. 606, fig. 214; Canadian Nat. Geol., 5, 1860, p. 298, fig. 1; Acadian Geol., Suppl. Chap., 1860, p. 57, footnote; p. 68, fig. 63; *ibid.*, 2d ed., 1878, p. 77, fig. 14; Geol. Mag., dec. 2, 4, 1877, p. 57, fig. 2.

Silurian (Moydart, Stonehouse): Arisaig, Nova Scotia.

**Homalonotus delphinocephalus** (Green).

Trimerus delphinocephalus Green, Mon. Tril. North America, 1832, p. 82, pl. 32, fig. 1.—Harlan, Trans. Geol. Soc. Pennsylvania, 1, pt. 1, 1834, p. 105.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724, fig. 1402.

Brongniartia platycephala Harlan, Trans. Geol. Soc. Pennsylvania, 1, pt. 1, 1834, p. 105.

*Homalonotus atlas* Castelnau, Ess. Syst. Sil. l'Amer. Sept., 1843, p. 20, pl. 4, fig. 4.

*Homalonotus giganteus* Castelnau, *ibid.*, p. 20, pl. 3, fig. 1.

*Homalonotus herculaneus* Castelnau, *ibid.*, p. 20, pl. 4, fig. 5.

*Ogygies latissimus* Eaton, Amer. Jour. Sci. and Arts, 21, 1832, p. 136.

*Homalonotus delphinocephalus* Murchison, Sil. Syst., 1839, p. 651.—Hall, Geol. New York, pt. 4, 1843, p. 103, fig. 34, tab. org. rem., 11, fig. 1.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 307, pl. 34, p. 311.—Hall, Pal. New York, 2, 1852, p. 104, pl. 31, figs. 5a-b; p. 309, pl. 6S, figs. 1-14.—Billings, Canadian Nat., Geol., 1, 1856, p. 320, fig. 10.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 8, fig. 4.—Hall, Trans. Albany Inst., 4, 1863, p. 227.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 319, fig. 339.—Chapman, Canadian Jour., n. s., 8, 1863, p. 32, fig. 148; p. 212, fig. 222; Expos. Min.

**Homalonotus delphinocephalus**—Continued.

Geol. Canada, 1864, p. 140, fig. 148; p. 184, fig. 222.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1877, doc. ed., pl. 32, figs. 17, 18; mus. ed., 1879, p. 187, pl. 32, figs. 17, 18; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 332, pl. 34, figs. 17, 18.—Miller, N. A. Geol. Pal., 1889, p. 550, fig. 1014.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 288, fig.—Grabau, Bull. Buffalo Soc. Nat. Hist., 7, 1901, p. 221, fig. 153; Bull. New York State Mus. Nat. Hist., 45, 1901, p. 221, fig. 153.—Foerste, Cincinnati Soc. Nat. Hist., Jour. 21, 1909, p. 34, pl. 2, figs. 19a-c.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 317, fig. 1630.

Upper Clinton: Niagara County, etc., New York; Pennsylvania; Maryland; Ontario (Rochester); Lewis County, Kentucky (West Union); ?Waldron, Indiana (Waldron).

*Plastotype*.—Cat. No. 4910, U.S.N.M.

**HOMALONOTUS GIGANTEUS** Castelnau. See *Homalonotus delphinocephalus*.

**HOMALONOTUS HERCULANEUS** Castelnau. See *Homalonotus delphinocephalus*.

**Homalonotus linares** Salter.

*Homalonotus Linares* Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 66, pl. 5, figs. 1, 2.

Silurian: Mount Illampu, Bolivia.

**Homalonotus trentonensis** Simpson.

*Homalonotus trentonensis* Simpson, Trans. Amer. Phil. Soc., n. s., 16, 1890, p. 460, fig. 31.

*Brongniartia trentonensis* Collie, Bull. Geol. Soc. Amer., 14, 1903, p. 418, pl. 59, figs. 1, 2.

Trenton: Reedsville, Bellefonte, etc., Pennsylvania.

**HOMOCRINUS** Hall.

Genotype: *H. parvus* Hall.

*Homocrinus* Hall, Pal. New York, 2, 1852, p. 185; *ibid.*, 3, for 1859, 1861, p. 102.—Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 182.—Zittel, Handb. Pal., 1, 1879, p. 361.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 285, 300 (Rev. Pal., pt. 1, pp. 62, 77); *ibid.*, 1886, p. 115; *ibid.*, 1890, p. 380; Amer. Jour. Sci., 3d ser., 26, 1883, p. 376, fig. 6.—Miller, N. A. Geol. Pal., 1889, p. 255.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 16; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 101; Geol. Mag., dec. 4, 6, 1899, p. 33, fig. 7; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 179, fig.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 155.—Zittel, Grundzuge Pal., 1, 1910, p. 152.—Slocum, Field Columbian Mus., 2, Geol. Ser., 1908, p. 289, fig. 7.—Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 473.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 217.

**HOMOCRINUS? ÆMULUS** Wachsmuth and Springer. See *Cyathocrinus? æmulus*.

**HOMOCRINUS ALTERNATUS** Hall. See *Dendrocrinus alternatus*.

**Homocrinus ancilla** (Hall).

*Dendrocrinus ancilla* Hall, Trans. Albany Inst., 10, 1883, p. 65 (adv. sheets, 1879, p. 9); 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 271, pl. 15, fig. 19.

*Homocrinus ancilla* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 144 (Rev. Pal., pt. 3, sec. 2, p. 220).—Slocum, Field Columbian Mus., 2, 1908, p. 289, pl. 85, figs. 9-11.

Niagaran: Waldron, Indiana (Waldron); near Lemont, Illinois (Racine).



*HOMOCRINUS ANGUSTATUS* Meek and Worthen. See *Dendrocrinus angustatus*.

*HOMOCRINUS CONSTRICTUS* Hall. See *Ohiocrinus constrictus*.

***Homocrinus cylindricus* Hall.**

*Homocrinus cylindricus* Hall, Pal. New York, 2, 1852, p. 186, pl. 41, figs. 2a-c, 3a-c.—Slocum, Field Columbian Mus., 2, Geol. Ser., 1908, p. 291, pl. 84, figs. 14, 15.

Niagaran: Lockport, New York (Rochester); near Lemont, Illinois (Racine).

*HOMOCRINUS GRACILIS* Hall. See *Dendrocrinus gracilis*.

*HOMOCRINUS LAXUS* Hall. See *Ohiocrinus laxus*.

*HOMOCRINUS NUCLEUS* Wachsmuth and Springer. See *Botryocrinus nucleus*.

***Homocrinus parvus* Hall.**

*Homocrinus parvus* Hall, Pal. New York, 2, 1852, p. 185, pl. 41, figs. 1a-f.—Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 474, pl. 42, figs. 1-8.

Clinton (Rochester): Lockport, New York.

*HOMOCRINUS POLYDACTYLUS* Shumard. See *Cupulocrinus polydactylus*.

*HOMOCRINUS POLYXO* Wachsmuth and Springer. See *Botryocrinus polyxo*.

*HOMOCRINUS SCOPARIUS* Hall. See *Lasiocrinus scoparius*.

*HOMOCYSTIS* Carpenter. See *Cheirocrinus Eichwald*.

*HOMOCYSTITES* Barrande. See *Cheirocrinus Eichwald*.

***HOMŒOSPIRA* Hall and Clarke.**

Genotype: *Rhynchospira evax* Hall.

*Homœospira* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 112; 13th Ann.

Rep. New York State Geol., 1895, p. 792.—Schuchert, Zittel-Eastman Textb.

Pal., 1, 1900, p. 337; 2d ed., 1913, p. 414.—Grabau, Bull. Buffalo Soc. Nat.

Sci., 7, 1901, p. 200; Bull. New York State Mus., 45, 1901, p. 200.—Grabau

and Shimer, N. A. Index Fossils, 1, 1907, p. 344.

***Homœospira apriniformis* Hall.**

*Atrypa aprinis* Hall (not Verneuil), Pal. New York, 2, 1852, p. 280, pl. 57, fig. 7.

*Rhynchospira?* *aprinis* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

*Rhynchospira apriniformis* Hall, Pal. New York, 3, 1859, p. 485.

*Rhynchonella aprinis* Miller, N. A. Geol. Pal., 1889, p. 367.

*Homœospira apriniformis* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 111,

pl. 83, figs. 24, 25.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 200,

fig. 121; Bull. New York State Mus., 45, 1901, p. 200, fig. 121.

Clinton (Rochester): Lockport, New York.

***Homœospira beecheri* Foerste.**

*Homœospira beecheri* Foerste, Jour. Geol., 11, 1903, p. 709; Bull. Sci. Lab.

Denison Univ., 14, 1909, p. 90, pl. 1, figs. 8A, B.

Niagaran (Brownsport): Brownsport Furnace, Decatur County, Tennessee.

***Homœospira evax* (Hall).**

*Rhynchospira evax* Hall, Trans. Albany Inst., 4, 1863, p. 213.

*Retzia evax* Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 160, pl.

25, figs. 13-21; 11th Rep. State Geol. Indiana, 1882, p. 302, pl. 25, figs. 13-

21.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 55, pl. 5,

figs. 1-9.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 863, figs.—

Miller, N. A. Geol. Pal., 1889, p. 366, fig. 604.

**Homœospira evax**—Continued.

*Homœospira evax* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 112, pl. 50, figs. 15–20 (?32–35).

*Homeospira* (*Retzia*) *evax* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 344, fig. 441.

Niagaran (Waldron): Waldron, etc., Indiana; Newsom, Tennessee.

**Homœospira fiscellostriata** Savage.

*Homœospira fiscellostriata* Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 87, pl. 4, figs. 23, 24.

Upper Medinan (Edgewood): Louisiana, Missouri.

**Homœospira immatura** Savage.

*Homœospira immatura* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 51, pl. 1, figs. 16–18.

Upper Medinan (Girardeau): Near Thebes, Illinois.

**Homœospira pisum** Foerste.

*Homœospira pisum* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 90, pl. 1, fig. 7.

Niagaran (Brownsport): Bath Springs, Tennessee.

**Homœospira schucherti** Foerste.

*Homœospira schucherti* Foerste, Jour. Geol., 11, 1903, p. 709; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 89, pl. 1, fig. 10A, B.

Niagaran (Brownsport): Brownsport Furnace, etc., Tennessee.

**Homœospira schucherti elongata** Foerste.

*Homœospira schucherti-elongata* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 89, pl. 1, fig. 9A, B.

Niagaran (Brownsport): Bath Springs, Tennessee.

**Homœospira sobrina** (Beecher and Clarke).

*Retzia sobrina* Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 61, pl. 5, figs. 10–16.

*Homœospira sobrina* Hall and Clarke, Pal. New York, 8 pt. 2, 1893, p. 112, pl. 50, figs. 26–28.

Niagaran (Waldron): Waldron, Indiana.

**Homœospira subcircularis** Savage.

*Homœospira subcircularis* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 88, pl. 4, figs. 26, 27.

Upper Medinan (Edgewood-Noix): Near Louisiana, Missouri.

**HOMOTRYPA** Ulrich.

Genotype: *H. curvata* Ulrich.

*Homotrypa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 240.—Foord, Contr.

Micro-Pal. Cambro-Sil., 1883, p. 9.—Miller, N. A. Geol. Pal., 1889, p. 309.—

Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 370, 409.—Rominger, Amer. Geol.,

6, 1890, p. 119.—Ulrich, Geol. Minnesota, 3, 1893, p. 235; Zittel's Textb.

Pal., (Engl. ed.), 1896, p. 273.—Simpson, 14th Ann. Rep. State Geol. New

York for 1894, 1897, p. 575.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173,

1900, p. 29.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, pp. 565, 566.—Grabau

and Shimer, N. A. Index Fossils, 1, p. 128.—Cumings, 32d Ann. Rep. Dep.

Geol. Nat. Res. Indiana, 1908, p. 748.—Bassler, Bull. U. S. Nat. Mus., 77,

1911, pp. 184, 185; Zittel-Eastman Textb. Pal., 1913, p. 332, fig. 475.



**Homotrypa alta** Cumings and Galloway.

*Homotrypa alta* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1913, p. 77, pl. 9, figs. 1-1c; pl. 10, figs. 1-1c.

Maysville (Mount Hope-Fairmount): Big Four Railroad, near Guilford, Indiana.

**Homotrypa? arbuscula** Ulrich.

*Homotrypa arbuscula* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 409, pl. 38, figs. 3-3c.—Keyes, Missouri Geol. Surv., 5, 1894, p. 13.

Black River: High Bridge, Kentucky (Lowville); Calhoun County and Dixon, Illinois (Platteville).

*Cotypes*.—Cat. Nos. 43304, 43305, U.S.N.M.

**Homotrypa austini** Bassler.

*Homotrypa austini* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 584, pl. 24, figs. 5-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 838, pl. 16, figs. 7-7b; pl. 29, figs. 11, 11a.

Richmond (Whitewater): Near Wilmington, Ohio.

*Cotypes*.—Cat. No. 41762, U.S.N.M.

**Homotrypa bassleri** Nickles.

*Homotrypa bassleri* Nickles, Jour. Cincinnati Soc. Nat. Hist., 20, 1902, p. 103, 104, fig. 1-5.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 578.

Richmond (Arnheim): Lebanon, Oregonia, etc., Ohio.

**Homotrypa callosa** Ulrich.

*Homotrypa callosa* Ulrich, Geol. Minnesota, 3, 1893, p. 243, pl. 20, figs. 15-21.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 139, 140 (p. 576).

Trenton: Burgin and Frankfort, Kentucky (Wilmore); Cannon Falls, Minnesota (Prosser).

*Cotypes*.—Cat. Nos. 43578, 43579, U.S.N.M.

**Homotrypa cincinnatiensis** Bassler.

*Homotrypa cincinnatiensis* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 576, pl. 21, figs. 4-10.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity; Maysville and McKinney, Kentucky.

*Cotypes*.—Cat. No. 41744, U.S.N.M.

**Homotrypa communis** Bassler.

*Homotrypa communis* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 581, pl. 23, figs. 1-4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 839, pl. 17, figs. 1-1d; pl. 29, fig. 12.

Richmond (Waynesville): Oregonia, Waynesville, etc., Ohio; Indiana; Kentucky.

*Cotypes*.—Cat. No. 41755, U.S.N.M.

**Homotrypa? confluens** (Foerste).

*Monotrypella confluens* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 172; *ibid.*, 3, 1888, pl. 16, fig. 4.

*Homotrypa confluens* Foerste, Geol. Surv. Ohio, 7, 1895, p. 600.

Upper Medinan (Brassfield): Dayton, Ohio.

**HOMOTRYPA CONSTELLARIFORMIS** Cumings. See *Homotrypa ramulosa*.

**Homotrypa curvata** Ulrich.

*Homotrypa curvata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 242, pl. 10, figs. 7-7d.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 137, 138 (p. 576).—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 575.—

**Homotrypa curvata**—Continued.

Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Cumings, 32d Ann. Rep. Dept. Geol. Nat. Res. Indiana, 1908, p. 840, pl. 17, figs. 3–3b; pl. 29, fig. 13.

Monticulipora curvata J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 71. Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 41729, U.S.N.M.

**Homotrypa curvata praeipta** Bassler.

Homotrypa curvata var. praeipta Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 575, pl. 23, fig. 15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 841, pl. 18, fig. 4; pl. 30, fig. 7, 7a.

Eden (Southgate): West Covington, Kentucky.

*Holotype*.—Cat. No. 41735, U.S.N.M.

**Homotrypa cylindrica** Bassler.

Homotrypa cylindrica Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 585, pl. 22, figs. 8–13.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 842, pl. 17, figs. 4, 4a; pl. 29, fig. 14.

Richmond (Whitewater): Richmond and Versailles, Indiana; Oxford, Ohio.

*Cotypes*.—Cat. No. 41758, U.S.N.M.

**Homotrypa dawsoni** (Nicholson).

Monticulipora (Heterotrypa) Dawsoni Nicholson, Genus Monticulipora, 1881, p. 141, pl. 5, figs. 3–3f.

Monticulipora dawsoni Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 241.—James and James, *ibid.*, 11, 1888, p. 15.—J. F. James, *ibid.*, 18, 1895, p. 68.

Homotrypa dawsoni Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 291.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 581, pl. 25, figs. 9, 10.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 842, pl. 17, figs. 5, 5a; pl. 30, fig. 1.

Richmond (Waynesville): Waynesville, Clarksville, etc., Ohio; Versailles, Indiana.

*Plesiotypes*.—Cat. No. 41749, U.S.N.M.

**Homotrypa dumosa** Bassler.

Homotrypa dumosa Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 576, pl. 20, fig. 1; pl. 21, figs. 1–3.

Maysville (Fairmount): Covington, Kentucky, and vicinity.

*Cotypes*.—Cat. No. 41741, U.S.N.M.

**Homotrypa exilis** Ulrich.

Homotrypa exilis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 80; Geol. Minnesota, 3, 1893, p. 236, pl. 19, figs. 10–16.

Black River (Decorah): Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 43574, U.S.N.M.

**Homotrypa flabellaris** Ulrich.

Homotrypa flabellaris Ulrich, Geol. Surv. Illinois, 8, 1890, p. 411, pl. 32, figs. 3–3c.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 580.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 845, pl. 18, figs. 1–1b; pl. 30, fig. 2.

Monticulipora flabellaris J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 75.

Maysville (Richmond): Wilmington, Illinois (Fernvale); Ohio; Indiana; Kentucky; Tennessee.

Figured sections of *cotypes*.—Cat. No. 43767, U.S.N.M.



**Homotrypa flabellaris frondosa** Bassler.

*Homotrypa frondosa* Cumings (not *Chaetetes frondosus* Edward and Haime, nor *Monticulipora frondosa* D'Orbigny), Amer. Geol., 29, 1902, p. 208, pl. 10, figs. 11, 12; pl. 11, figs. 2, 5; pl. 12, fig. 1.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 579.

*Homotrypa flabellaris* var. *frondosa* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 846, pl. 18, figs. 3, 3b; pl. 30, fig. 3.

Richmond (Arnheim): Harmans Station, Indiana; Ohio.

**Homotrypa flabellaris spinifera** Bassler.

*Homotrypa flabellaris* var. *spinifera* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 580, pl. 21, figs. 11–15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 847, pl. 18, fig. 2.

Maysville and Richmond: Cincinnati, Ohio, and vicinity (Fairmount); Richmond, Indiana; Oxford, etc., Ohio (Richmond).

*Holotype*.—Cat. No. 41778, U.S.N.M.

*HOMOTRYPA FRONDOSA* Cumings. See *Homotrypa flabellaris frondosa*.

**Homotrypa gelasinosa** Ulrich.

*Homotrypa gelasinosa* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 410, pl. 32, figs. 2–2d.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 587.

*Monticulipora gelasinosa* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 202.

Richmond (Fernvale): Wilmington, Illinois.

Figured sections of *holotype*.—Cat. No. 43768, U.S.N.M.

**Homotrypa glabra** Cumings and Galloway.

*Homotrypa glabra* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 78, pl. 11, figs. 1–1d.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

**Homotrypa grandis** Bassler.

*Homotrypa grandis* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 578, pl. 20, figs. 7–10.

Maysville (Leipers): Near Goodlettsville, Davidson County, Tennessee.

*Cotypes*.—Cat. No. 41764, U.S.N.M.

*HOMOTRYPA INSIGNIS* Ulrich. See *Homotrypa subramosa-insignis*.

**Homotrypa? intercalaris** Ulrich.

*Homotrypa? intercalaris* Ulrich, Geol. Minnesota, 3, 1893, p. 238, fig. 13.

Black River (Decorah): St. Paul and Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 43577, U.S.N.M.

**Homotrypa libana** Bassler.

*Homotrypa libana* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 578, pl. 22, figs. 1–3.

Richmond (Arnheim): Lebanon, Ohio.

*Holotype*.—Cat. No. 34329, U.S.N.M.

**Homotrypa minnesotensis** Ulrich.

*Homotrypa minnesotensis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 79; Geol. Minnesota, 3, 1893, p. 235, pl. 19, figs. 1–9.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Sardeson, Jour. Geol., 9, 1901, p. 12.

Black River (Decorah): Minneapolis, St. Paul, Fountain, etc., Minnesota; Decorah, Iowa; Kentucky; Tennessee.

*Cotypes*.—Cat. Nos. 43571, 43572, U.S.N.M.

**Homotrypa minnesotensis montifera** Ulrich.

*Homotrypa minnesotensis* var. *montifera* Ulrich, Geol. Minnesota, 3, 1893, p. 236, pl. 19, fig. 3a.

Black River (Decorah): St. Paul, Minnesota.

*Holotype*.—Cat. No. 43573, U.S.N.M.

**Homotrypa nicklesi** Bassler.

*Homotrypa nicklesi* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 586, pl. 22, figs. 4-7.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 847, pl. 18, figs. 6, 6a; pl. 30, fig. 4.

Richmond: Raywick, Kentucky.

*Cotypes*.—Cat. No. 34328, U.S.N.M.

*HOMOTRYPA NITIDA* Bassler. See *Homotrypa ramulosa*.

**Homotrypa nodulosa** Bassler.

*Homotrypa nodulosa* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 582, pl. 23, figs. 5-11; pl. 25, fig. 15.

Richmond: Hanover, Ohio (Waynesville); Richmond, Indiana (Whitewater).

*Cotypes*.—Cat. No. 41753, U.S.N.M.

**Homotrypa obliqua** Ulrich.

*Homotrypa obliqua* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 243, pl. 10, figs. 6, 6b.—Miller, N. A. Geol. Pal., 1889, fig. 489 (p. 310).—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 124.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 575, pl. 23, figs. 12-14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 848, pl. 19, figs. 1-1b; pl. 30, fig. 6.

Maysville (Fairmount-Corryville): Cincinnati, Ohio, and vicinity.

*Holotype* and *plesiotypes*.—Cat. Nos. 43671, 41736, U.S.N.M.

**Homotrypa pulchra** Bassler.

*Homotrypa pulchra* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 577, pl. 20, figs. 11-14.

Maysville (Mount Auburn): Cincinnati, Lebanon, etc., Ohio.

*Cotypes*.—Cat. No. 41747, U.S.N.M.

**Homotrypa ramulosa** Bassler.

*Homotrypa ramulosa* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 585, pl. 25, figs. 1-4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 849, pl. 19, figs. 2-2b; pl. 30, fig. 8.

*Homotrypa constellariformis* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 839, pl. 17, figs. 2-2b.

*Homotrypa nitida* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 586, pl. 20, fig. 15; pl. 25, figs. 5-8.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 848, pl. 18, figs. 5, 5a; pl. 30, figs. 5, 5a.

Richmond (Whitewater): Versailles, Weisburg Station, Osgood, etc., Indiana.

*Cotypes*.—Cat. Nos. 41771, 41760, U.S.N.M.

Observation.—*H. nitida*, *H. ramulosa*, and *H. constellariformis* have been found to represent the same species, the first being based on the immature branches, the second on the main portions of the zoaria, and the third on the best developed parts.

**Homotrypa richmondensis** Bassler.

*Homotrypa richmondensis* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 582, pl. 24, figs. 1-4.



**Homotrypa richmondensis**—Continued.

Richmond (Whitewater): Richmond and Versailles, Indiana; Hanover, Oxford, etc., Ohio.

*Cotypes*.—Cat. No. 41784, U.S.N.M.

**Homotrypa separata** Ulrich.

*Homotrypa separata* Ulrich, Geol. Minnesota, 3, 1893, p. 237, pl. 19, figs. 17–20.—

Bassler, Zittel-Eastman Textb. Pal., 1913, p. 332, fig. 477d.

Black River (Decorah): Minneapolis, Chatfield, etc., Minnesota.

*Holotype*.—Cat. No. 43576, U.S.N.M.

**Homotrypa? similis** Foord.

*Homotrypa similis* Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 10, pl. 2,

figs. 2–2d.—Ulrich, Geol. Minnesota, 3, 1893, p. 242, pl. 20, figs. 28–33.—

Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 185–187.

Trenton: Ottawa, Ontario; St. Paul, Cannon Falls, etc., Minnesota.

Middle Ordovician (Wassaleu): Uxnorn, near Reval, Esthonia, Russia.

*Plesiotypes*.—Cat. Nos. 43575, 57273, U.S.N.M.

*HOMOTRYPA SOLIDA* Nickles and Bassler. See *Eridotrypa solida*.

**Homotrypa spinea** Cumings and Galloway.

*Homotrypa spinea* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res.

Indiana, 1913, p. 79, pl. 11, figs. 1–1c; pl. 12, figs. 1–1d.

Maysville (Mount Hope-Fairmount): Big Four Railroad, near Guilford, Indiana.

**Homotrypa splendens** Bassler.

*Homotrypa splendens* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 587, pl. 25, figs. 11–14.

Richmond (Fernvale): Wilmington, Illinois.

*Cotypes*.—Cat. No. 41761, U.S.N.M.

**Homotrypa subramosa** Ulrich.

*Homotrypa subramosa* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota,

1886, p. 81; Geol. Minnesota, 3, 1893, p. 239, pl. 19, figs. 21–23.—Ulrich,

Zittel's Textb. Pal. (Engl. ed.), fig. 451A–C (not D=*Homotrypa separata*

Ulrich) (p. 273).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 128,

fig. 186c.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 332, fig. 477a–c;

Bull. U. S. Nat. Mus., 77, 1911, pp. 187–189, figs. 99, 100.

Black River (Decorah) and Trenton (Prosser): St. Paul, Minneapolis, etc., Minnesota; Decorah, Iowa.

Middle Ordovician (Kuckers): Reval, Esthonia, Russia.

*Cotypes and plesiotypes*.—Cat. Nos., 43570, 57274, U.S.N.M.

**Homotrypa subramosa insignis** (Ulrich).

*Homotrypa insignis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 82.

*Homotrypa subramosa* var. *insignis* Ulrich, Geol. Minnesota, 3, 1893, p. 239.

Trenton (Prosser): St. Paul and Goodhue and Fillmore Counties, Minnesota. Decorah, Iowa.

*Cotypes*.—Cat. No. 43998, U.S.N.M.

**Homotrypa tuberculata** Ulrich.

*Homotrypa tuberculata* Ulrich, Geol. Minnesota, 3, 1893, p. 240, fig. 14.

Black River (Decorah): Cannon Falls, Minnesota.

*Cotypes*.—Cat. No. 43580, U.S.N.M.

**Homotrypa wortheni** (James).

Monticulipora (*Monotrypa*) *wortheni* James, Paleontologist, no. 6, 1882, p. 50; no. 7 (1883), pl. 1, fig. 2.

Monticulipora *wortheni* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 207.—James and James, *ibid.*, 10, 1888, p. 184, pl. 11, figs. 3a, b.

Homotrypa *wortheni* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 582, pl. 24, figs. 10-14.—Cumings, 32d Ann. Rept. Dep. Geol. Nat. Res. Indiana, 1908, p. 849, pl. 19, figs. 3, 3c; pl. 30, fig. 9.

Richmond (Whitewater): Lynchburg, etc., Ohio; Richmond, etc., Indiana.

*Plesiotypes*.—Cat. No. 41766, U.S.N.M.

**Homotrypa wortheni intercellata** Bassler.

Homotrypa *wortheni* var. *intercellata* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 584, pl. 24, fig. 17.

Richmond (Whitewater?): Near Osgood and Versailles, Indiana.

*Cotypes*.—Cat. No. 41768, U.S.N.M.

**Homotrypa wortheni prominens** Bassler.

Homotrypa *wortheni* var. *prominens* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 584, pl. 24, fig. 15, 16.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 851, pl. 30, fig. 10.

Richmond (Elkhorn): Near Richmond, Indiana.

*Cotypes*.—Cat. No. 41767, U.S.N.M.

**HOMOTRYPELLA** Ulrich.

Genotype: *Homotrypella instabilis* Ulrich.

Homotrypella Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1888, p. 83.—Miller, N. A. Geol. Pal., 1889, p. 310.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 370, 412; Geol. Minnesota, 3, 1893, p. 228.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 586.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 29.—Ulrich and Bassler, Smiths. Misc. Coll. Quart., 47, 1904, p. 21.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 189; Zittel-Eastman Textb. Pal., 1913, p. 332.

Peronoporella Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 81. (Genotype: *P. dubia* Cumings and Galloway.)

**Homotrypella contexta** Ulrich.

Homotrypella *contexta* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 412, pl. 32, figs. 5-5b. Monticulipora *contexta* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 74.

Richmond (Fernvale): Wilmington, Illinois.

Fragment of *holotype*.—Cat. No. 43763, U.S.N.M.

**Homotrypella dubia** (Cumings and Galloway).

Peronoporella *dubia* Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 82, pls. 15, 16, 17.

Maysville (Bellevue) and Richmond (Arnheim): Big Four Railroad, near Harmon Station, Indiana.

**HOMOTRYPELLA GRACILIS** Ulrich. See *Bythopora gracilis*.**Homotrypella granulifera** (Ulrich).

Chaetetes *granuliferus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 128, pl. 12, figs. 9-9b.

Batostomella *granulifera* Ulrich, *ibid.*, 5, 1882, p. 141.

Homotrypella *granulifera* Miller, N. A. Geol. Pal., 1889, p. 310.

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**Homotrypella granulifera**—Continued.

Monticulipora (Fistulipora) *granulifera* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 120.

Trenton (Wilmore): Burgin and Frankfort, Kentucky.

*Cotypes*.—Cat. No. 43669, U.S.N.M.

**Homotrypella hospitalis** (Nicholson).

Monticulipora (Prasopora) *Selwynii* var. *hospitalis* Nicholson, Genus Monticulipora, 1881, p. 209, fig. 45.

Monticulipora *hospitalis* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 26.

Prasopora *Selwynii* var. *hospitalis* Nicholson in Steinmann, Neues Jahrb. f. Min., Geol. Pal., 1, 1882, pl. 4, fig. 11.

Prasopora *hospitalis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 237.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 371.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 57, pl. 3, fig. 10.—Bassler, Proc. U. S. Nat. Mus., 30, p. 49, 1906, pl. 7, figs. 1-3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 871, pl. 23, figs. 1, 1b; pl. 31, fig. 6.

Homotrypella *hospitalis* Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 194 (gen. ref.).

Monticulipora (Heterotrypa) *winchelli* James, Paleontologist, No. 6, 1882, p. 48.

Monticulipora *winchelli* James, Paleontologist, No. 7, 1883, pl. 1, fig. 5; Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 87.

Richmond: A common species in Ohio, Indiana, Illinois, Kentucky, Tennessee, etc.

**Homotrypella hospitalis crassa** (Ulrich).

Atactoporella *crassa* Ulrich, Geol. Minnesota, 3, p. 225, pl. 10, figs. 18-21.

Homotrypella *hospitalis crassa* Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 193-195, figs. 104, 105.

Trenton: St. Paul and Cannon Falls, Minnesota (Prosser); West Covington, Kentucky.

Middle Ordovician (Wassalem): Uxnorn, near Reval, Esthonia, Russia.

*Holotype* and *plesiotypes*.—Cat. Nos. 43501, 57279, U.S.N.M.

**Homotrypella instabilis** Ulrich.

Homotrypella *instabilis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 83; Geol. Minnesota, 3, 1893, p. 229, pl. 18, figs. 9-20.—Simpson, 14th

Ann. Rep. State Geol. New York for 1894, 1897, figs. 168, 169 (p. 586).—

Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 189-192, figs. 101, 102.

Black River (Decorah): Minneapolis, St. Paul, Cannon Falls, etc., Minnesota.

Middle Ordovician: Near Reval, Esthonia, Russia.

*Cotypes* and *plesiotypes*.—Cat. Nos. 43561, 57275, U.S.N.M.

HOMOTRYPELLA MEEKI Ulrich. See Bythopora meeki.

**Homotrypella multiporata** Ulrich.

Homotrypella *multiporata* Ulrich, Geol. Minnesota, 3, 1893, p. 230, pl. 18, figs. 21, 22.

Black River (Decorah): St. Paul and Minneapolis, Minnesota.

Figured sections of *holotype*.—Cat. No. 43559, U.S.N.M.

**Homotrypella mundula** Ulrich.

Homotrypella *mundula* Ulrich, Geol. Minnesota, 3, 1893, p. 232, fig. 12a-c.

Trenton (Prosser): Decorah, Iowa; Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 43560, U.S.N.M.

**Homotrypella nodosa** Ulrich and Bassler.

*Homotrypella nodosa* Hayes and Ulrich, U. S. Geol. Surv. Folio 95, 1903, ill. sheet, fig. 14, 15.—Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 21, pl. 7, figs. 1-3.

Maysville (Leipers): Columbia, Nashville, etc., Tennessee.

*Cotypes*.—Cat. No. 43178, U.S.N.M.

**Homotrypella norwoodi** Nickles.

*Homotrypella norwoodi* Nickles, Bull. Kentucky Geol. Surv., No. 5, 1905, p. 45, pl. 1, fig. 9-11.

Trenton (Cynthiana?): Near Pleasant Valley, Nicholas County, Kentucky.

**Homotrypella? ovata** Ulrich.

*Homotrypella? ovata* Ulrich, Geol. Minnesota, 3, 1893, p. 231, pl. 18, figs. 23-30.

Trenton (Prosser): Cannon Falls and Minneapolis, Minnesota.

*Cotypes*.—Cat. No. 43562, U.S.N.M.

**Homotrypella rustica** Ulrich.

*Homotrypella rustica* Ulrich, Geol. Minnesota, 3, 1893, p. 234, pl. 18, figs. 31-33.

*Monticulipora* (*Fistulipora*) *rustica* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 120.

*Homotrypella* cf. *rustica* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 851, pl. 19, figs. 5, 5a; pl. 21, fig. 4; pl. 30, fig. 11.

Richmond (Maquoketa): Spring Valley, Minnesota.

Figured sections of *holotype*.—Cat. No. 43557, U.S.N.M.

HOMOTRYPELLA? *SUBGRACILIS* Ulrich. See *Bythopora subgracilis*.

HORISTOMA Fischer. See *Poleumita* Clarke and Ruedemann.

HORMOCERAS *GRACILE* Clarke and Ruedemann. See *Actinoceras gracile*.

HORMOCERAS *REMOTISEPTUM* Clarke and Ruedemann. See *Actinoceras remotiseptum*.

HORMOCERAS *TENUIFILUM* Clarke and Ruedemann. See *Actinoceras tenuifilum*.

**HORMOTOMA** Salter.

Genotype: *H. salteri* Ulrich (= *Murchisonia gracilis* Salter not Hall).

*Murchisonia* (part) of authors.

*Hormotoma* (subgenus of *Murchisonia*) Salter, Geol. Surv. Canada, Can. Org. Remains, dec. 1, 1859, pp. 18, 22.—Ehlert (subgenus *Murchisonia*), Extr. Bull. Soc. d'Etud. Sci. d'Angers, 1877, p. 18.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Bd., 1889, p. 368.—Donald, Quart. Jour. Geol. Soc. London, 51, 1895, p. 211; *ibid.*, 55, 1889, p. 257.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 959, 1012.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 950.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 648.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 525.

**Hormotoma? aculeata** (Billings).

*Loxonema aculeata* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55.

Anticostian (Gun River, Jupiter River): Near Chaloupe River, Anticosti.

**Hormotoma? agilis** (Billings).

*Murchisonia agilis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 235.

*Hormotoma? agilis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).

Canadian (Quebec—G, H): Cape Norman and Table Head, Newfoundland.



**Hormotoma anna** (Billings).

Murchisonia Anna Billings, Canadian Nat. Geol., 4, 1859, p. 358, figs. 8a-e; Geol. Canada, Geol. Surv. Canada, 1863, p. 119, fig. 32a-f.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 424, figs.

Hormotoma anna Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).  
Canadian: Mingan Islands, Canada.

**Hormotoma argylensis** (Sardeson).

Murchisonia argylensis Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 97, pl. 5, figs. 11, 12.

Canadian (Shakopee): Near Argyle, Wisconsin; Shakopee and Cannon Falls, Minnesota.

**Hormotoma? artemesia** (Billings).

Murchisonia Artemesia Billings, Pal. Foss., 1, 1865, Geol. Surv. Canada, p. 345, text fig. 332a, b.

Hormotoma? artemesia Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1013 (gen. ref.).—Bassler, Bull. Virginia Geol. Surv., 29, 1909, pl. 20, figs. 1, 2.

Canadian (Beekmantown): Counties of Leeds and Grenville, Canada; Virginia, etc.

**Hormotoma bellicincta** (Hall).

Murchisonia bellicincta Hall, Geol. Pal. New York, 1, 1847, p. 179, pl. 39, figs. 1a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 162, pl. 5, figs. 1a, b, 12.—Salter, Quart. Jour. Geol. Soc. London, 15, 1859, p. 380, pl. 13, fig. 11.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 183, fig. 177.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 314.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 18, fig. 7a.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 5, fig. 7.—Walcott, Amer. Jour. Sci. Arts, 3d ser., 35, 1888, p. 237, fig. 2.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage Bd., 1889, p. 371.—Lesley, Geol. Surv. Pennsylvania, P 4, 1889, p. 426, figs.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 123 (loc. occ.).

Hormotoma bellicincta Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1017, pl. 70, figs. 15-17.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 650, fig. 887a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, pl. 40, figs. 12, 12a.

Trenton: Watertown, Middleville, Trenton Falls, etc., New York; Goodhue County, Minnesota (Prosser).

*Plesiotypes*.—Cat. No. 45850, U.S.N.M. (Ulrich and Scofield).

**HORMOTOMA BOYLEI** Donald. See *Turritoma boylei*.

**Hormotoma? cassina** (Whitfield).

Murchisonia cassina Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 179, pl. 1, fig. 7.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 59, fig. 7.

Canadian (Beekmantown): Fort Cassin, Vermont.

**Hormotoma confusa** (Whitfield).

Murchisonia? confusa Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 54, pl. 8, figs. 16-18.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 60, figs. 6, 8.

Canadian (Beekmantown): Shoreham, Vermont.

**Hormotoma fasciata** Branson.

Hormotoma fasciata Branson, Trans. Acad. Sci. St. Louis, 18, 1909, p. 45, pl. 7, fig. 16.

Black River (Auburn—Decorah): Lincoln County, Missouri.

**Hormotoma funata** (Billings).

*Murchisonia funata* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55.

Anticostian (Gun River, Jupiter River): The Jumpers, Anticosti.

**Hormotoma gigantea** (Billings).

*Murchisonia gigantea* Billings, Geol. Surv. Canada, Rep. Progress for 1853-1856, 1857, p. 298; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55 (loc. ref.).

*Hormotoma gigantea* Schuchert and Twenhofel, Bull. Geol. Soc. Amer., 21, 1910, p. 702.

Gamachian (Ellis Bay): Prinista Bay, Anticosti.

**Hormotoma gracilens** (Whitfield).

*Murchisonia gracilens* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 53, pl. 8, figs. 14, 15.

*Hormotoma gracilens* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014, (gen. ref.). Canadian (Beekmantown): Beekmantown, New York.

**Hormotoma gracilis** (Hall).

*Murchisonia gracilis* Hall, Pal. New York, 1, 1847, p. 181, pl. 39, figs. 4a-c; p. 303, pl. 83, figs. 1a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 162, pl. 17, figs. 9-16; Man. Geol., 1860, p. 102, fig.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 1.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 18, 55.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 315.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 18, fig. 7c.—Whitfield, Geol. Wisconsin, 4, 1882, p. 217, pl. 5, fig. 19.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.—Walcott, Amer. Jour. Sci. Arts, 3d ser., 35, 1888, p. 239, fig. 7.—Miller, N. A. Geol. Pal., 1889, p. 411, fig. 687.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 428, figs.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 320.—Keyes, Missouri Geol. Surv., 5, 1894, p. 146.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 123.

*Murchisonia* cf. *gracilis* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 75, pl. 3, fig. 4.

*Hormotoma gracilis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 192.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 18-21, ?22.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, pl. 40, figs. 13a-b.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 649, figs. 885a-d, 886a-d.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 139, pl. 1, fig. 3.

Trenton-Richmond: Watertown, Middleville, etc., New York (Trenton). Widely distributed in the United States and Canada.

*Plesiotypes*.—Cat. No. 45851, U.S.N.M. (Ulrich and Scofield).

**Hormotoma gracilis angustata** (Hall).

*Murchisonia*? *angustata* Hall, Pal. New York, 1, 1847, p. 41, pl. 10, figs. 2a, b.

*Hormotoma gracilis* var. *angustata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 30-36.—Bassler, Bull. Virginia Geol. Surv., 2A, 1909, pl. 23, fig. 4.

Black River: Watertown, etc., New York; Canada; Virginia; Kentucky; Tennessee; Minnesota; Wisconsin; etc.

*Plesiotypes*.—Cat. Nos. 45852-45856, U.S.N.M.

**Hormotoma gracilis goodhuensis** Ulrich and Scofield.

*Hormotoma gracilis* var. *goodhuensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 42-43.

Black River (Decorah): Goodhue County, Minnesota.

*Cotypes*.—Cat. No. 45857, U.S.N.M.



**Hormotoma gracilis multivolvis** Ulrich and Scofield.

*Hormotoma gracilis* var. *multivolvis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 26-29.

Richmond (Maquoketa): Spring Valley, Minnesota.

*Cotypes*.—Cat. No. 45858, U.S.N.M.

**Hormotoma gracilis sublaxa** Ulrich and Scofield.

*Hormotoma gracilis* var. *sublaxa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 23-25.

Black River (Auburn-Decorah): Auburn, Lincoln County, Missouri.

*Cotypes*.—Cat. No. 45859, U.S.N.M.

**Hormotoma infrequens** (Billings).

*Murchisonia infrequens* Billings, Canadian Nat. Geol., 4, 1859, p. 457.

*Hormotoma infrequens* Raymond, Ann. Carnegie Mus., 4, 1908, p. 191, pl. 55, fig. 4.

Chazy (Aylmer): Grand Isle, near Cornwall, Canada.

**Hormotoma latiangularis** Branson.

*Hormotoma latiangularis* Branson, Trans. Acad. Sci. St. Louis, 18, 1909, p. 44, pl. 7, figs. 11, 12.

Black River (Auburn-Decorah): Auburn, Lincoln County, Missouri.

**Hormotoma(?) major** (Hall).

*Murchisonia major* Hall, Geol. Lake Superior Land Dist., 2, 1851, p. 209, pl. 26, figs. 1a-c.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 167.—Keyes, Missouri Geol. Surv., 5, 1894, p. 145, pl. 49, figs. 5a-b.

*Hormotoma?* *major* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1018, pl. 71, figs. 5-7.—Grabau and Shimer, N. A. Index Fossils 1, 1909, p. 650, fig. 889.

*Murchisonia bellicincta* Owen, Rep. Geol. Surv. Wisconsin, Iowa, and Minnesota, 1852, pl. 2, fig. 8.

Trenton (Prosser and Stewartville): Western shore of Green Bay, etc., Wisconsin; Stewartville, Hader, etc., Minnesota; Iowa; Pike County, Missouri.

*Plesiotype* and *plastotype*.—Cat. Nos. 17903, 45860, U.S.N.M.

**Hormotoma melaniaformis** (Shumard).

*Murchisonia melaniaformis* Shumard, 1st and 2d Ann. Rep. Geol. Surv., Missouri, pt. 2, 1855, p. 208, pl. C, fig. 13.—Keyes, Missouri Geol. Surv., 5, 1894, p. 145, pl. 49, fig. 3.

*Hormotoma?* *melaniaformis* Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 262 (gen. ref.).

Canadian: Franklin County, Missouri.

**Hormotoma multivolvis** (Billings).

*Murchisonia multivolvis* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-6, 1857, p. 299; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 18 (loc. ref.).

Richmond (English Head): Macasty Bay, Anticosti.

**Hormotoma obelisca** (Whitfield).

*Murchisonia* (*Fusispira?*) *obelisca* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 317, pl. 26, figs. 5, 6.

*Murchisonia obelisca* Seely, Vermont State Geol., Rep. 7, 1910, pl. 60, fig. 5.

Canadian (Beekmantown): Fort Cassin, Vermont.

**Hormotoma patriciaeense Parks.**

*Hormotoma patriciaeense* Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 36.

Niagaran (Guelph): Severn River, Ontario.

**Hormotoma procris (Billings).**

*Murchisonia Procris* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 34 (adv. sheets, 1862).

*Hormotoma procris* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

**HORMOTOMA RUGOSA** Schuchert and Twenhofel. See *Loxonema rugosa*.

**Hormotoma salteri Ulrich.**

*Hormotoma salteri* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, figs. 44-51.—Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 262, pl. 21, figs. 7-11.—Weller, Geol. Surv. New Jersey Pal., 3, 1903, p. 183, pl. 12, fig. 29.—

Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 649, figs. 887c-d.

Trenton: Between Burgin and Danville, Kentucky (Flanagan); New Jersey.

*Cotypes*.—Cat. No. 45861, U.S.N.M.

**Hormotoma salteri canadensis Ulrich.**

*Murchisonia (Hormotoma) gracilis* Salter, Geol. Surv. Canada, Can. Org. Rem., Dec. 1, 1859, p. 22.—Billings, Geol. Surv. Canada, Geol. Canada, 1863, p. 183, fig. 178.

*Hormotoma salteri* var. *canadensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, fig. 44.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada; near Lebanon, Tennessee.

**Hormotoma salteri nitida Ulrich.**

*Hormotoma salteri* var. *nitida* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016.

Trenton (Flanagan): Between Burgin and Danville, Kentucky.

*Holotypes*.—Cat. No. 45862, U.S.N.M.

**Hormotoma salteri tennesseensis Ulrich.**

*Hormotoma salteri* var. *tennesseensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, fig. 49.

Black River: Between Nashville and Lebanon, Tennessee.

*Cotypes*.—Cat. No. 45863, U.S.N.M.

**Hormotoma simulatrix (Billings).**

*Murchisonia simulatrix* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 232, text fig. 218.

*Hormotoma simulatrix* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).

Chazy (Quebec, —H—M): Table Head and Point Rich, Newfoundland.

**Hormotoma subangulata Ulrich and Scofield.**

*Hormotoma subangulata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, figs. 37-41.

Black River (Decorah): Chatfield and near Cannon Falls, Minnesota.

*Cotypes*.—Cat. Nos. 45864-45866, U.S.N.M.

**Hormotoma subcarinata Grabau.**

*Hormotoma subcarinata* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 173, pl. 24, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 650.

Upper Monroan: Wayne County, Michigan (Lucas); Amherstburg, Ontario (Amherstburg).



**Hormotoma subulata** (Conrad).

- Loxonema subulata* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 273, pl. 16, fig. 14.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 100.  
*Murchisonia subulata* Hall, Pal. New York, 2, 1852, p. 91, pl. 28, figs. 7a, b, c, d.  
*Holopella*? cf. *Loxonema subulata* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 291, pl. 5, fig. 21.  
*Loxonema*? (cf. *Holopella*) *subulata* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 556, pl. 30, fig. 21.  
 Early Silurian: Medina, Reynales Basin, and Wolcott, New York (Clinton); Todds Fork and Dayton, Ohio (Brassfield).

**Hormotoma tenera** Savage.

- Hormotoma tenera* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 96, pl. 6, fig. 9.  
 Upper Medinan (Edgewood): Near Edgewood and Louisiana, Missouri.

**Hormotoma terebriformis** Foerste.

- Hormotoma terebriformis* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 137, pl. 3, figs. 8a, b.  
 Trenton (Upper): Near Rogers Gap, Kentucky.

**Hormotoma teretiformis** (Billings).

- Murchisonia teretiformis* Billings, Geol. Surv. Canada Rep. Progr. for 1853-1856, 1857, p. 298; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 18, 55.  
*Murchisonia bellicincta* var. *teretiformis* Whiteaves, Canadian Rec. Sci., 5, 1893, p. 320.  
*Hormotoma teretiformis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).  
 Richmond (Charleton): Charleton Point, Anticosti.

**Hormotoma trentonensis** Ulrich and Scofield.

- Murchisonia bellicincta* Hall (part), Pal. New York, 1, 1847, pl. 39, fig. 1e (not 1a-1d).—Owen, Geol. Rep. Wisconsin, Iowa, Minnesota, 1852, pl. 2, fig. 8.  
*Murchisonia major* Whitfield (not Hall), Geol. Wisconsin, 4, 1882, p. 244, pl. 9, fig. 4.  
*Hormotoma trentonensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1017, pl. 70, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 650, fig. 887b, 888.  
 Trenton: New York, Canada, Minnesota, Illinois, Kentucky, Tennessee.  
*Holotype*.—Cat. No. 45867, U.S.N.M.

**Hormotoma tricarinata** Grabau.

- Hormotoma tricarinata* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 175, pl. 25, figs. 3-4.  
 Upper Monroan (Lucas): Gibraltar quarry, Wayne County, Michigan.

**Hormotoma vesta** (Billings).

- Murchisonia Vesta* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 276, fig. 280; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 32, fig. 33 (adv. sheets, 1862).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 431, fig.—Koken, Neues Jahrb. Min., Geol. Pal., 6, 1889, Beilage-Band, p. 375.  
*Hormotoma vesta* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).  
 Canadian (Beekmantown): Phillipsburg, Quebec.

**Hormotoma whiteavesi** Clarke and Ruedemann.

- Hormotoma whiteavesi* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 72, pl. 8, figs. 5, 9.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 332.

**Hormotoma whiteavesi**—Continued.

*Loxonema magnum* Whiteaves (not Whitfield), Geol. Surv. Canada, Pal. Foss., 3, pt. 1, 1884, p. 17 (loc. occ.); Geol. Surv. Canada, Pal. Foss., 3, pt. 2, p. 87, pl. 13, fig. 2.

Niagaran (Guelph): Galt, Hespeler, and Elora, Ontario; Shelby and Rochester New York.

**Hormotoma winnipegensis** Whiteaves.

*Hormotoma winnipegensis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 192, pl. 21, fig. 1.

*Murchisonia winnipegensis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 768 (gen. ref.).

Black River or Richmond: Lake Winnipeg, Canada.

**HORNERA?** *DICHOTOMA* Hall. See *Thamniscus dichotomus*.

**HORTHOLUS AMERICANUS** D'Orbigny. See *Barrandeoceras americanum*.

**HOUGHTONIA** Rominger. See *Calapœcia* Billings.

**HUDSONASTER** Stürtz.

Genotype: *Palæasterina rugosa* Billings.

*Palæaster* (part) of authors.

*Hudsonaster* Stürtz, Verh. naturh. Ver. preuss. Rheinl., etc., 1899, p. 224.—Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 21; Bull. U. S. Nat. Mus., 88, 1915, p. 53.

*Protopalæaster* Hudson, Ottawa Nat., 26, 1912, p. 5; *ibid.*, 27, 1913, pp. 77–84.—Raymond, *ibid.*, 1912, p. 105. (Genotype: *P. narrawayi* Hudson.)

**Hudsonaster incomptus** (Meek).

*Palæaster incomptus* Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 275; Geol. Surv. Ohio, Pal., 1, 1873, p. 64, pl. 4, figs. 5a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 577, figs.—James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 133.

*Palæaster simplex* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 29, pl. 1, fig. 6.—Miller, N. A. Geol. Pal., 1889, p. 266, fig. 380.—James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 132.

*Palæaster clarkei* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 102, pl. 3, fig. 5.

*Palæaster clarkana* Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 236.—James, *ibid.*, 18, 1895, p. 133.

*Hudsonaster incomptus* Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 21; Bull. U. S. Nat. Mus., 88, 1915, p. 61, pl. 6, figs. 1, 2.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Waynesville, Raysville, etc., Ohio.

**Hudsonaster matutinus** (Hall).

*Asterias matutina* Hall, Pal. New York, 1, 1847, pp. 91, 318, pl. 29, figs. 5a, b.

*Coelaster matutina* D'Orbigny, Prodr. de Pal., 1, 1849, p. 22 (gen. ref.).

*Palæaster matutina* Hall, 20th Rep. New York State Cab. Hist., p. 283, rev. ed., 1868 (1870), p. 325, pl. 9, fig. 2.

*Hudsonaster matutinus* Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 21; Bull. U. S. Nat. Mus., 88, 1915, p. 57, pl. 2, fig. 2; pl. 3, fig. 2; pl. 5, figs. 1, 2.

*Petraster rigidus* (part) Billings, Geol. Surv. Canada, Can. Org. Rem., dec. 3, 1858, pl. 10, fig. 3b (not fig. 3a).—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 294; rev. ed., 1870, p. 337.

Trenton: Trenton Falls, etc., New York; Lachine, Quebec; Government House Bay, Ontario.



**Hudsonaster milleri** Schuchert.

*Hudsonaster milleri* Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 22;

Bull. U. S. Nat. Mus., 88, 1915, p. 60, pl. 4, fig. 2.

Trenton (Wilmore): Fayette County, Kentucky.

**Hudsonaster narrawayi** (Hudson).

*Protopalaester narrawayi* Hudson, Ottawa Nat., 26, 1912, p. 25, pl. 1-3; Bull.

New York State Mus., 164, 1913, p. 130, pl. 5.—Raymond, Ottawa Nat., 26, 1912, p. 105, figs. 2-4.—Hudson, Ottawa Nat., 27, 1913, pp. 77-84, 2 pls.

*Hudsonaster narrawayi* Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p.

22; Bull. U. S. Nat. Mus., 88, 1915, p. 59, pl. 1, fig. 1; pl. 2, fig. 1; pl. 4, fig. 1.

Black River: City View Postoffice, Ottawa, Ontario; St. Paul, Minnesota  
Stones River (Lebanon): Shelbyville, Tennessee.

**Hudsonaster rugosus** (Billings).

*Palaeasterina rugosa* Billings, Geol. Surv. Canada, Rep. Progress for 1853-56, 1857, p. 291; Geol. Surv. Canada, Can. Org. Rem., 3, 1858, p. 77, p. 19.—Chap-

man, Canadian Jour., n. s., 6, 1861, p. 517.—Wright, Mon. British Foss. Echin., Oolitic, 2, pt. 1, 1862 (Pal. Soc. for 1861), p. 27.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 9.

*Hudsonaster rugosa* Stüztz, Verh. naturh. Ver. preuss. Rheinl., 56, etc., 1899, p. 225.—Schuchert, Bull. U. S. Nat. Mus., 88, 1915, p. 64, pl. 3, fig. 1.

Richmond (Charleton): Charleton Point, Anticosti.

**HUGHMILLERIA** Sarle.

Genotype: *H. socialis* Sarle.

*Hughmilleria* Sarle, Bull. New York State Mus., Pal., 69, 9, 1903, p. 1087.—Clarke,

Bull. New York State Mus., 107, 1907, p. 307.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 412.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 329.—Clarke, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 785.

**Hughmilleria magna** Clarke and Ruedemann.

*Hughmilleria magna* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 341, pl. 85, figs. 11-19.

Trenton (Schenectady): Schenectady, Duaneburg, and Rotterdam Junction, Schoharie County, New York.

**Hughmilleria shawangunk** Clarke.

*Hughmilleria shawangunk* Clarke, Bull. New York State Mus., 107, 1907, p. 308,

pl. 4, figs. 1-4; pl. 5, figs. 1-6, 8, 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 413, fig. 1714.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 342, pls. 64-66; pl. 69, fig. 1.

Medinan (Shawangunk): Otisville, New York; Delaware Water Gap, Pennsylvania.

**Hughmilleria socialis** Sarle.

*Hughmilleria socialis* Sarle, Bull. New York State Mus., 69, 1903, p. 1091, pls.

6-9, 10, figs. 1-6, 8, 9; 11-14; 15, figs. 4-6; 24, fig. 1; 25, figs. 1, 3, 4; 26, figs. 3, 5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 413, fig. 1714.—Clarke and Ruedeman, Mem. New York State Mus., 14, 1912, p. 335, pls. 59-63 (p. 428, fig. 118, *Hughmilleria pittsfordensis* in error).

Cayugan (Pittsford): Pittsford, New York.

**Hughmilleria socialis robusta** Sarle.

*Hughmilleria socialis* var. *robusta* Sarle, Bull. New York State Mus., 69, 1903, p. 1097, pl. 21, figs. 1, 2.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 340, pl. 63, fig. 16.

Cayugan (Pittsford): Pittsford, New York.

**HUNGAIA** Walcott.Genotype: *Dikelocephalus magnificus* Billings.*Hungaia* Walcott, *Smiths. Misc. Coll.*, 57, 1914, p. 351.**Hungala magnifica** (Billings).*Dikelocephalus magnificus* Billings, *Canadian Nat. Geol.*, 5, 1860, p. 307, fig. 5; *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 235, figs. 255a, b; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 299, fig. 376.*Remopleurides magnificus* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 294 (gen. ref.).*Dicelloccephalus magnificus* Matthew, *Trans. Roy. Soc. Canada*, 10, sec. 4, 1893, p. 11, footnote.—Frech, *Leth. Geog.*, *Leth. Pal.*, 2, 1897, Bd., pl. 1b, figs. 18a, b.*Apatokephalus magnificus* Brögger, *Nyt Mag. f. Naturvid.*, 36, 1897, p. 175, fig. 10, p. 184.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

**HURONIA** Stokes.Genotype: *H. bigsbyi* Stokes.*Huronia* Stokes, *Trans. Geol. Soc. London*, 2d ser., 1, 1824, Expl. pl. 28; *Proc. Geol. Soc. London*, 2, 1838, p. 689; *Trans. Geol. Soc. London*, 2d ser., 5, 1840, p. 710.—Woodward, *Man. Mollusca*, pt. 2, 1851, p. 88, fig. 49.—Saemann, *Palæontographica*, 3, 1852, pp. 156, 161.—Barrande, *Neues Jahrb. f. Min.*, etc., 1855, p. 407.—Billings, *Geol. Surv. Canada*, *Rep. Progr. for 1853–56*, 1857, p. 326.—Barrande, *Syst. Sil. du Centre Boheme*, 2, pt. 3, 1874, p. 784; *Cephalopodes*, *Ext. Syst. Sil. du Centre Boheme*, 1877, p. 104.—Zittel, *Handb. Pal.*, 2, 1884, p. 369.—Hyatt, *Proc. Boston Soc. Nat. Hist.*, 22, 1884, p. 273.—Miller, *N. A. Geol. Pal.*, 1889, p. 442.—Foord, *Cat. Foss. British Mus.*, 1, 1888, p. 199.*HURONIA ANNULATA* Hall. See *Huronia bigsbyi*.**Huronia bigsbyi** Stokes.*Huronia Bigsbyi* Stokes, *Trans. Geol. Soc. London*, 2d ser., 1, 1824, Expl. pl. 28, fig. 1.—Barrande, *Syst. Sil. du Centre Boheme*, 2, pt. 3, 1874, p. 743, pl. 436, figs. 1–3; *Supp.*, 1877, pl. 474, figs. 2–4.*Huronia annulata* Hall, *Geol. Lake Sup. Land District*, Foster and Whitney's *Rep.*, 1851, p. 221, pl. 34, fig. 4.

Niagaran: Drummond Island, Lake Huron.

**Huronia distincta** Barrande.*Huronia* sp. Stokes, *Trans. Geol. Soc. London*, 2d ser., 5, 1840, p. 710, pl. 40, fig. 2.*Huronia distincta* Barrande, *Syst. Sil. du Centre Boheme*, 11, pt. 3, 1874, p. 745, pl. 231, fig. 2.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 207.

Niagaran: Drummond Island, Lake Huron.

**Huronia minuens** Barrande.*Huronia minuens* Barrande, *Syst. Sil. du Centre Boheme*, 11, pt. 3, 1874, p. 744, pl. 435, fig. 4.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 204.

Niagaran: Drummond Island, Lake Huron.

**Huronia obliqua** Stokes.*Huronia* sp. Stokes, *Trans. Geol. Soc. London*, 2d ser., 5, pt. 3, 1840, p. 710, pl. 40, fig. 3.*Huronia obliqua* Stokes, *Trans. Geol. Soc. London*, 2d ser., 1, 1824, pl. 28, fig. 4.—Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1843, p. 32, pl. 9, fig. 1.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 205.*Orthoceras (Huronia)* sp. Barrande, *Syst. Sil. Boheme*, 2, 3, 1874, p. 743, pl. 231, fig. 3.

Niagaran: Drummond Island, Lake Huron.



**Huronia persiphonata** (Billings).

*Orthoceras persiphonatum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 329; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 57 (loc. ref.).

*Huronia persiphonata* Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 204.

Anticostian (Gun River, Jupiter River): Cormorant Point, Anticosti.

**Huronia portlocki** Stokes.

*Huronia Portlockii* Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol.

Soc. London, 2d ser., 5, 1840, p. 710, pl. 40, fig. 5.—Foord, Cat. Foss. Ceph.

British Mus., 2, 1891, p. 383.—Ami, Canadian Rec. Sci., 4, 1891, p. 399.

*Orthoceras* (*Huronia*) *Portlocki* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 741, pl. 232, fig. 4.

Niagaran: Drummond Island, Lake Huron.

**HURONIA ROMINGERI** Barrande. See *Huronia turbinata*.

**HURONIA SPHÆROIDALIS** Stokes. See *Actinoceras sphæroidale*.

**Huronia turbinata** Stokes.

*Huronia turbinata* Stokes, Trans. Geol. Soc. London, 2d ser., 1, 1824, Expl. pl. 28, fig. 3.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 206.

*Huronia romingeri* Barrande, Syst. Sil. Boheme, 2, 3, 1874, p. 758; Suppl. 1877, pl. 474, figs. 5, 6.

Niagaran: Drummond Island, Lake Huron; Point Detour, Michigan.

**Huronia vertebralis** Stokes.

*Huronia vertebralis* Stokes, Trans. Geol. Soc. London, 2d ser., 1, 1824, Expl. pl. 28, figs. 2, 6.—Woodward, Man. Mollusca, pt. 1, 1851, p. 89, fig. 49, footnote; 3d ed., 1875, p. 192, fig. 56.—Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 221, pl. 24, fig. 1.—Barrande, Syst. Sil. du Centre Boheme, 2, 1874, pt. 3, p. 746, pl. 231, figs. 6, 7, pl. 436, figs. 5-7.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 16, fig. 3.—Zittel, Handb. Pal., 2, 1884, p. 369, fig. 508.—Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 202.—Miller, N. A. Geol. Pal., 1889, p. 442, text fig. 744.

*Orthoceras canadense* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, pp. 321-328; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 57.

Niagaran: Drummond Island, Lake Huron.

Anticostian (Chicotte): Southwest Point, Anticosti.

**HYALOSTELIA** Zittel.

Genotype: *Hyalonema smithi* Young.

*Hyalostelia* Zittel, Handb. Pal., 1, 1879, p. 185.—Hinde, Mon. British Foss.

Sponges, Pal. Soc., 1888, p. 109.—Koken, Die Leitfossilien, Leipzig, 1896, p.

342.—Zittel-Eastman Textb. Pal., 1, 1900, p. 55; *ibid.*, 2d ed., 1913, p. 62.

**Hyalostelia? metissica** Dawson.

*Hyalostelia Metissica* Dawson, Canadian Rec. Sci., 3, 1888, p. 54.—Hinde, Canadian Rec. Sci., 3, 1888, p. 68.—Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 49, fig. 20.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 108, fig. 17, pl. 3, fig. 10.

*Pyritonema metissicum* Rauff, Palæontographica, 40, 1894, p. 261.

Canadian? (Levis?): Little Metis, Quebec.

**HYALOSTELIA SOLIVAGA** Ulrich. See *Hindia sphæroidalis*.

**HYATTELLA** Hall and Clarke. See *Hyattidina* Schuchert.

**HYATTELLA JUNIA** Hall and Clarke. See *Hyattidina congesta junia*.

**HYATTIDINA** Schuchert.Genotype: *Atrypa congesta* Conrad.

*Hyattella* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 61, fig. 45; 13th Ann. Rep. New York State Geol., 1895, p. 767.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 338.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 348.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 204; Bull. New York State Mus., 45, 1901, p. 204.

*Hyattidina* (*Hyattella* preoccupied) Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 415.

***Hyattidina charletona*** Twenhofel.

*Hyattidina charletona* Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 34, pl. 1, figs. 6, 7.

Richmond (Charleton): Charleton Point, Anticosti.

***Hyattidina congesta*** (Conrad).

*Atrypa congesta* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 265, pl. 16, fig. 18.—Hall, Geol. New York, Rep. 4th Dist., 1843, p. 71, fig. 2; Pal. New York, 2, 1852, p. 67, pl. 23, fig. 1.—Billings, Canadian Nat. Geol., 1, 1856, p. 136, pl. 2, fig. 4.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 632.

*Atrypa quadricostata* Hall, Pal. New York, 2, 1852, p. 68, pl. 23, fig. 2.

*Triplesia? congesta* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

*Triplesia? quadricostata* Hall, *ibid.*, 1859, p. 78.

*Rhynchonella quadricostata* Miller, N. A. Geol. Pal., 1889, p. 369.

*Camerella congesta* Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 48.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 112, figs.

*Hyattella congesta* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 61, fig. 45; pl. 40, figs. 23–28; pl. 81, figs. 26–28.—Grabau, Bull. New York State Mus., 45, 1901, pp. 204, 205, figs. 131, 131a; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 204, figs. 131, 131a.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 348, figs. 451–452.

Clinton (Lower): Rochester, Reynales Basin, etc., New York; Ontario.

Anticostian (Gun River): Island of Anticosti.

*Plesiotypes*.—Cat. No. 51340, U.S.N.M. (Nettelroth).

***Hyattidina congesta junia*** (Billings).

*Athyris junia* Billings, Catalogue Sil. Foss. Anticosti, 1866, p. 46.

*Hyattella junia* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 62, pl. 40, figs. 29–31.

Anticostian (Gun River): Six miles east of Otter River, Jupiter River, and the Jumpers, Anticosti.

***Hyattidina? lamellosa*** (Weller).

*Hyattella? lamellosa* Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 258, pl. 23, figs. 15–18.

Helderbergian (Rondout): Two miles south of Tristates, New York.

**HYBOCRINUS** Billings.Genotype: *H. conicus* Billings.

*Hybocrinus* Billings, Geol. Surv. Canada, Rep. Progr., 1853–56, 1857, p. 274; Geol. Surv. Canada, dec. 4, 1859, p. 23.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 8th ser., 21, 1874, p. 5.—Zittel, Handb. Pal., 1, 1879, p. 350.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 285, 297, 373 (Rev. Pal., 1, p. 74, 150); *ibid.*, 1886, pp. 110, 119, 122; *ibid.*, 1890, pp. 355, 390, 393, pl. 10, fig. 7.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 152.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, pp. 298,



**HYBOCRINUS**—Continued.

305.—Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 26, 1883, p. 365.—Miller, N. A. Geol. Pal., 1889, p. 255.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 3; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 21; Geol. Mag., dec. 4, 6, 1889, p. 33, fig. 6; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 145, fig. 57, 3.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 151.—Zittel, Grundzuge Pal., 1910, p. 151.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 500.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, pp. 13–23; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 211.

**HYBOCRINUS (ANOMALOCRINUS)** Meek and Worthen. See *Anomalocrinus* Meek.

**Hyboerinus conicus** Billings.

*Hyboerinus conicus* Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1857, p. 274; Geol. Surv. Canada, dec. 4, 1859, p. 29, pl. 2, figs. 2a, b.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 153.—Miller, N. A. Geol. Pal., 1889, p. 255, fig. 341.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, pl. 4, fig. 6.

Trenton (Curdsville): Ottawa, Ontario; Mercer County, Kentucky.

**HYBOCRINUS? (ANOMALOCRINUS) INCURVUS** Meek and Worthen. See *Anomalocrinus incurvus*.

**Hyboerinus pristinus** Billings.

*Hyboerinus pristinus* Billings, Geol. Surv. Canada, dec. 3, 1858, p. 25, figs. 4, 5; dec. 4, 1859, p. 23, pl. 1, fig. 2a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501.

Chazy (Aylmer): Caughnawaga, and Islands of Montreal, Jesus, and Bizard, Canada.

**Hyboerinus tumidus** Billings.

*Hyboerinus tumidus* Billings, Geol. Surv. Canada, Rep. Progr. 1853–56, 1857, p. 275; Geol. Surv. Canada, dec. 4, 1859, p. 28, pl. 2, figs. 1a–1e.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 153, pl. 5, figs. 2a–c.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, p. 298, fig. A; pl. 11, figs. 3–5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501, fig. 1812.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 18, pl. 5, figs. 1–5.

Trenton (Curdsville): Ottawa, Ontario; Woodford and Mercer Counties, Kentucky.

**HYBOCYSTIS** Bather. See *Hybocystites* Wetherby.

**HYBOCYSTITES** Wetherby.

Genotype: *H. problematicus* Wetherby.

*Hybocystites* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 150.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, p. 308.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 360, 373 (Rev. Pal., pp. 186, 199).—Miller, N. A. Geol. Pal., 1889, p. 256.—Zittel, Grundzuge Pal., 1910, p. 151.

*Hybocystis* Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 145.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, pp. 13–25; Zittel-Eastman Textb. Pal., 1, 1913, p. 211.

**Hybocystites eldonensis** (Parks).

*Hybocystis eldonensis* Parks, Ottawa Nat., 21, 1908, p. 234, pl. 2, fig. 4.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 13, pl. 2, figs. 1–10.

Trenton (Curdsville): Eldon township, Victoria County (near Kirkfield), Ontario. Observation.—Probably the same as *H. problematicus*.

**Hybocystites problematicus** Wetherby.

*Hybocystites problematicus* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 150, pl. 5, figs. 1a-c.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, p. 307, pl. 11, figs. 6-24.—Miller, N. A. Geol. Pal., 1889, p. 256, fig. 342.

*Hybocystis problematicus* Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 95, fig. 1.—Parks, The Ottawa Nat., 21, 1908, p. 232, pl. 2, figs. 1-3, 5.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 21 (under *H. eldonensis*); pl. 2, figs. 11, 12.

Trenton (Curdsville): Mercer and Woodford Counties, Kentucky; Kirkfield, Ontario.

**HYDROLÆNUS CONIFRONS** Salter. See *Illænus conifrons*.

**HYOLITHELLUS** Billings.

Genotype: *Hyolithes micans* Billings.

*Hyolithellus* Billings, Canadian Nat. Geol., n. s., 6, 1871, p. 240; Amer. Jour. Sci., 3d ser., 3, 1872, p. 360.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 141.—Miller, N. A. Geol. Pal., 1889, p. 391.—Matthew, Trans. Roy. Soc. Canada, 2d ser., 5, sec. 4, 1899, p. 107.

**Hyolithellus papillatus** Walcott.

*Hyolithellus papillatus* Walcott, Smiths. Misc. Coll., 57, 1912, p. 267, pl. 43, figs. 3, 4.

Upper Cambrian or Ozarkian (Potsdam): Marble River, near Chateaugay, Franklin County, New York.

*Holotype*.—Cat. No. 58553, U.S.N.M.

**HYOLITHES** Eichwald.

Genotype: *H. acutus* Eichwald.

*Hyolithes* Eichwald, Sil. Sch. Syst., Ebstland, 1840, p. 97.—Barrande, Syst. Sil. du Centre Boheme, 3, 1867, p. 55.—Billings, Canadian Nat., n. s., 6, 1871, p. 213.—Ford, Amer. Jour. Sci., 3d ser., 1, 1871, p. 472; 3, 1872, p. 352.—Kayser, Beitr. Geol. Pal. Argent. Repub., Pal. Suppl., 3, 1876, p. 8.—Hall, Pal. New York, 5, pt. 2, 1879, p. 191.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1880, p. 175.—Zittel, Handb. Pal., 2, 1882, p. 316.—Koninck, Ann. d. Mus. Roy. d'Hist. Nat. de Belgique, 8, 1883, p. 223.—Matthew, Trans. Roy. Soc. Canada, 3, sec. 4, 1886, p. 45.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 131.—Remele, Zeits. d. d. geol. Gesell., 41, 1889, p. 762.—Miller, N. A. Geol. Pal., 1889, p. 391.—Matthew, Canadian Rec. Sci., 5, 1893, pp. 435-436, 437.—Holm, Sveriges Geol. Unders., ser. C, No. 112, 1893, p. 6, 9, 13, 45, 151.—Matthew, Canadian Rec. Sci., 5, 1893, p. 433.—Koken, Die Leitfossilien, Leipzig, 1896, p. 98, fig. 77; p. 400.—Matthew, Trans. Roy. Soc. Canada, 2d ser., 7, sec. 4, 1901, p. 93.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 950.

**Hyolithes baconi** Whitfield.

*Hyolithes Baconi* Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 77; Geol. Wisconsin, 4, 1882, p. 225, pl. 6, figs. 9-11.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 158, fig.

Black River (Platteville): Beloit, etc., Wisconsin; Minnesota.

**Hyolithes cliftonensis** Foerste.

*Hyolithes cliftonensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 62, pl. 3, figs. 38a, b.

Clinton (Osgood): Clifton, Tennessee.

**Hyolithes(?) dubius** Miller and Faber.

*Hyolithes(?) dubius* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 155, pl. 8, fig. 23.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 964, pl. 42, fig. 3.

Richmond: Versailles, Indiana.



**Hyolithes gibbosus** Hall and Whitfield.

*Hyolithes gibbosus* Hall and Whitfield, 23d Ann. Rep. New York State Cab. Nat. Hist., 1873, p. 242, pl. 11, figs. 1-3.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 265, pl. 43, figs. 5, 6.

Upper Cambrian or Ozarkian (Potsdam sandstone): Ausable Chasm, Essex County, New York.

**Hyolithes newsomensis** Foerste.

*Hyolithes newsomensis* Foerste, Jour. Geol., 11, 1903, p. 707; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 63, pl. 1, figs. 3A, B.

Niagaran (Waldron): Newsom, Swallow Bluff, and Iron City, Tennessee.

**Hyolithes parviusculus** (Hall).

*Theca parviuscula* Hall, Geol. Wisconsin, 1862, p. 55, fig. 10.

*Hyolithes parviusculus* James, Amer. Geol., 5, 1890, p. 355.

Richmond (Maquoketa): Wisconsin, Illinois, Iowa, and Missouri.

**Hyolithes pinniformis** Ruedemann.

*Hyolithes pinniformis* Ruedemann, Bull. New York State Mus., 162, 1912, p. 111, pl. 7, figs. 12, 13.

Trenton (Canajoharie): Canajoharie, New York.

**Hyolithes rhine** Ruedemann.

*Hyolithes rhine* Ruedemann, Bull. New York State Mus., 49, 1901, p. 36, pl. 2, figs. 12-15.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Hyolithes subimbricatus** Ringueberg.

*Hyolithes subimbricatus* Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1888, p. 135, pl. 7, fig. 7.

Clinton (Rochester): Lockport, New York.

**Hyolithes vanuxemi** Walcott.

*Hyolithes Vanuxemi* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 85, pl. 11, figs. 16, 16a, b.

Lower Pogonip: Northeast of Adams Hill, Eureka District, Nevada.

*Cotypes*.—Cat. No. 17375, U.S.N.M.

**Hyolithes versallesensis** Miller and Faber.

*Hyolithes versallesensis* Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 155, pl. 8, figs. 20-22.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 765, fig. 1409.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 965, pl. 42, figs. 4, 4a.

Richmond: Versailles, Indiana.

**HYPANTHOCRINITES** Phillips. See *Eucalyptocrinus* Goldfuss.

**HYPANTHOCRINITES DECORUS** Hall. See *Eucalyptocrinus cælatus lævis*.

**HYPANTHOCRINUS** Hall. See *Eucalyptocrinus* Goldfuss.

**HYPANTHOCRINUS DECORUS** Hall. See *Eucalyptocrinus cælatus levis*.

**HYPSELOCONUS** Berkey.

Genotype: *Metoptoma recurva* Whitfield.

*Hypseloconus* Berkley, Amer. Geol., 21, 1898, p. 282.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 604.

**Hypseloconus recurvus** (Whitfield).

*Metoptoma recurva* Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 61; Geol. Wisconsin, 4, 1882, p. 196, pl. 3, figs. 14, 15.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 142, fig.

**Hyseloconus recurvus**—Continued.

*Hyseloconus recurvus* Berkey, Amer. Geol., 21, 1898, p. 284, pl. 19, figs. 3-8, 13-16, 27-31; pl. 21, figs. 8, 12, 13, 14, 16, 20.—Sardeson, Jour. Geol., 11, 1903, p. 479, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 604, fig. 804a, b.

Ozarkian (Mendota): East of Baraboo, Wisconsin.

**HYPTIOCRINUS** Wachsmuth and Springer. See *Cyphocrinus* Miller.

**HYPTIOCRINUS TYPUS** Wachsmuth and Springer. See *Cyphocrinus gorbyi*.

**HYSTRICURUS** Raymond. Genotype: *Bathyrus conicus* Billings.

*Hystericurus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 60; Zittel-Eastman Textb. Pal., 1913, p. 716.

**Hystericurus conicus** (Billings).

*Bathyrus conicus* Billings, Canadian Nat. Geol., 4, 1859, p. 266, fig. 12d; Geol. Canada, Geol. Surv. Canada, 1863, p. 122, fig. 42; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 353, fig. 341.—Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 61, pl. 13, figs. 15-21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 57, figs. 4, 5.

*Hystericurus conicus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 60, pl. 7, fig. 9.

Canadian (Beekmantown): St. Timothy, on Beauharnois Canal, Canada; Comstock Landing, New York; Fort Cassin, Vermont; Cow Head, Newfoundland (Quebec-P).

**Hystericurus cordai** (Billings).

*Bathyrus Cordai* Billings, Canadian Nat. Geol., 5, 1860, p. 321, fig. 26; *ibid.*, 6, 1861, p. 314; Geol. Canada, Geol. Surv. Canada, 1863, p. 238, fig. 269; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 259, fig. 242; p. 412, fig. 395.

*Bathyrus seelyi* Whitfield, Bull. Amer. Mus. Nat. Hist., 11, 1889, p. 62, pl. 13, figs. 8-14.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 57, figs. 6, 7.

*Hystericurus cordai* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61.

Canadian: Point Levis, Quebec (Levis conglomerates); Phillipsburg, Quebec (Beekmantown); Cow Head and Bay St. John, Newfoundland.

**Hystericurus crotalifrons** (Dwight).

*Bathyrus* (?) *crotalifrons* Dwight, Amer. Jour. Sci., 3d ser., 27, 1884, p. 253, pl. 7, figs. 4, 4a, 5, 6.

*Hystericurus crotalifrons* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61.

Canadian (Beekmantown): Rochdale, Dutchess County, New York.

**Hystericurus? tuberculatus** (Walcott).

*Bathyrus?* *tuberculatus* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 91, pl. 12, fig. 9.

Upper Pogonip: Ridge southwest of Wood Cove, Eureka District, Nevada.

*Cotype*.—Cat. No. 24654, U.S.N.M.

**ICHNOPHYCUS** Hall.

Genotype: *I. tridactylus* Hall.

*IchNOPHYCUS* Hall, Pal. New York, 2, 1852, p. 26.—Miller, N. A. Geol. Pal., 1889, p. 120.

**IchNOPHYCUS tridactylus** Hall.

*IchNOPHYCUS tridactylus* Hall, Pal. New York, 2, 1852, p. 26, pl. 10, fig. 7a, b.—Miller, N. A. Geol. Pal., 1889, p. 120, fig. 41.

Clinton: New Hartford, New York.



**ICHTHYOCRINUS** Conrad.Genotype: *I. lævis* Conrad.

*Ichthyocrinus* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 1842, 8, p. 279.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 46.—Hall, Pal. New York, 2, 1852, pp. 195–355.—McCoy, British Pal. Rocks Foss., 1854, p. 54.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 319.—Hall, Rep. Geol. Surv. Iowa, 1, 1858, pt. 2, p. 557.—Beyrich, Ann. Mag. Nat. Hist., 4th ser., 7, 1871, p. 403.—Salter, Cat. Camb. and Sil. Foss., 1873, p. 126.—Angelin, Icon. Crinoid., 1878, p. 13.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 252; *ibid.*, 1886, p. 67; *ibid.*, 1888, p. 353; *ibid.*, 1890, p. 387.—Zittel, Handb. Pal., 1, 1879, p. 355.—Miller, N. A. Geol. Pal., 1889, p. 256.—Bather, Nat. Sci., 12, 1898, p. 341.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 145, fig. 53.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188, fig. 108.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 163.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 159; Bull. New York State Mus., 45, 1901, p. 159.—Springer, Jour. Geol., 14, 1906, p. 516.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 563.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 204.

***Ichthyocrinus? clintonensis* Hall.**

*Ichthyocrinus? clintonensis* Hall, Pal. New York, 2, 1852, p. 181, pl. A40, fig. 5. Lower Clinton: Reynales Basin, Niagara County, New York.

***Ichthyocrinus conoideus* Ringueberg.**

*Ichthyocrinus conoideus* Ringueberg, Ann. New York Acad. Sci., 5, 1890, p. 305, pl. 3, fig. 5.—Springer, Mon. Crin. Flex., Smith. Inst. (in press).  
Niagaran (Lockport-Gasport member): Lockport, New York.

***Ichthyocrinus corbis* Winchell and Marcy.**

*Ichthyocrinus corbis* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 89, fig.—Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 175, pl. 4, fig. 5; N. A. Geol. Pal., 1889, p. 256, fig. 343.  
Niagaran (Racine): Chicago and Cicero, Illinois.

***Ichthyocrinus lævis* Conrad.**

*Ichthyocrinus lævis* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 279, pl. 15, fig. 16.—Hall, Pal. New York, 2, 1852, p. 195, pl. 43, figs. 2a–p.—Billings, Canadian Nat. Geol., 1, 1856, p. 59, pl. fig. 4.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 319, pl. 100, fig. 17.—Emmons, Man. Geol., 1860, p. 110, fig. 100.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, fig. 3.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 258.—Miller, N. A. Geol. Pal., 1889, p. 256, fig. 344.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 159, fig. 54; Bull. New York State Mus., 45, 1901, p. 159, fig. 54.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 564, fig. 1900.  
*Cyathocrinites pyriformis* Hall, Nat. Hist. New York Geol., 4, 1843, p. 11, fig. 3; p. 112, tab. ill. 17, fig. 3.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 314, fig. 3.  
*Cyathocrinus pyriformis* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 167, figs.

*Lecanocrinus simplex* Hall, Pal. New York, 2, 1852, p. 202, pl. 46, figs. 2a–e.

*Ichthyocrinus simplex* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879 (Rev. Pal., 1, 1879, p. 35).

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario.

**ICHTHYOCRINUS SIMPLEX** Wachsmuth and Springer. See *Ichthyocrinus lævis*.***Ichthyocrinus subangularis* Hall.**

*Ichthyocrinus subangularis* Hall, Trans. Albany Inst., 4, 1863, p. 201 (abstract, p. 7); 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), p. 325, pl.

**Ichthyocrinus subangularis**—Continued.

11 (2), figs. 15, 16; p. 385, fig. 11; p. 391; rev. ed., 1870, p. 367, pl. 11, figs. 15, 16; p. 429, text fig; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 16, figs. 11–13; mus. ed., 1879, p. 137, pl. 16, figs. 11–13; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 268, pl. 15, figs. 12, 13; pl. 16, figs. 11–13.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, p. 146, pl. 15, figs. 3–5.—Springer, Jour. Geol., 14, 1906, p. 477, pl. 6, fig. 2; Mon. Crin. Flex., Smith. Inst. (in press).

Niagaran: Waldron, Indiana (Waldron); Bridgeport and Romeo, Illinois (Racine).

**IDIOCRINUS** Wachsmuth and Springer. See *Gazacrinus* Miller.

**IDIOCRINUS ELONGATUS** Wachsmuth and Springer. See *Gazacrinus inornatus*.

**IDIOCRINUS TENNESSEENSIS** Wachsmuth and Springer. See *Ormocrinus tennesseensis*.

**IDIOSTROMA** Winchell.

Genotype: *I. caespitosum* Winchell.

*Idiostroma* Winchell, Proc. Amer. Assoc. Adv. Sci., 15, 1867, p. 99.—Nicholson, Mon. British Strom., Pal. Soc., 1886, pp. 10, 11, 99.

**Idiostroma nattressi** Grabau.

*Idiostroma nattressi* Grabau, Michigan Geol. Surv., Geol., 1st ser., 1909, p. 94, pl. 9, figs. 5–7; pl. 8, figs. 2, 3.

Upper Monroan (Anderdon and Amherstburg): Near Amherstburg, Ontario.

**IDIOTRYPA** Ulrich.

Genotype: *Idiotrypa parasitica* Ulrich.

*Idiotrypa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 272.—Miller, N. A. Geol. Pal., 1889, p. 310.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 375.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 591.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 34.—Bassler, *ibid.*, 292, 1906, p. 39.

**IDIOTRYPA PARASITICA** Ulrich. See *Idiotrypa punctata*.

**Idiotrypa punctata** (Hall).

*Trematopora*?? *punctata* Hall, Pal. New York, 2, 1852, p. 151, pl. 40A, figs. 4a–c. *Idiotrypa punctata* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 40, pl. 17, figs. 4–10; pl. 24, figs. 17–19.

*Idiotrypa parasitica* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 273, pl. 13, figs. 1–1c.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 187–189 (p. 591).

Clinton: Rochester, Lockport, etc., New York (Rochester); Osgood, Indiana (Osgood).

*Plesiotypes*.—Cat. Nos. 35496, 43674, U.S.N.M. (Holotype of *I. parasitica*).

**ILIONIA** Billings.

Genotype: *I. canadensis* Billings.

*Ilionia* Billings, Canadian Nat., n. s., 7, 1874, p. 301.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 13.—Miller, N. A. Geol. Pal., 1889, p. 483.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 379.

**Ilionia canadensis** Billings.

*Ilionia Canadensis* Billings, Canadian Nat., n. s., 7, 1874, p. 301, fig. 1, 2.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 13, fig. 3; p. 14, fig. 4; *ibid.*, pt. 2, 1905, p. 67.

Silurian: Port Daniel, Bay of Chaleurs, Quebec; Elora and Hespeler, Ontario (Guelph).



***Ilionia? costulata* Whiteaves.**

*Ilionia*(?) *costulata* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 15, pl. 2, fig. 5; *ibid.*, pt. 2, 1895, p. 68 (loc. occ.).

Niagaran (Guelph): Elora and Durham, Ontario.

*ILIONIA GALTENSIS* Whiteaves. See *Prolucina galtensis*.

***Ilionia? parvula* Whiteaves.**

*Ilionia*(?) *parvula* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 288, pl. 28, figs. 6-8.

Niagaran: Ami Island near northeast shore of Lake Winnipegosis, Manitoba.

***Ilionia sinuata* (Hall).**

*Anatina?* *sinuata* Hall, Pal. New York, 3, 1859, p. 265, pl. 49, figs. 3a-3d.

*Ilionia sinuata* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 15.—Schuchert, Amer. Geol., 31, 1903, p. 168.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 379.

Cayugan (Cobleskill and Manlius): Litchfield and Winfield, Herkimer County, New York.

***ILLENOIDES* Weller.**

Genotype: *I. triloba* Weller.

*Ilænoides* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 226.

***Ilænoides triloba* Weller.**

*Ilænoides triloba* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 226, pl. 17, figs. 6-9; pl. 19, figs. 12-14.

Niagaran (Racine): Bridgeport, Joliet, and near Lemont, Illinois.

***ILLENURUS* Hall.**

Genotype: *I. quadratus* Hall.

*Ilænurus* Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, p. 176; Trans. Albany Inst., 5, 1867, p. 167.—Zittel, Handb. Pal., 2, 1885, p. 612.—Miller, N. A. Geol. Pal., 1889, p. 550.

*ILLENURUS COLUMBIANA* Weller. See *Smyphysurus convexus*.

***Ilænurus convexus* Whitfield.**

*Ilænurus convexus* Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 66; Geol. Wisconsin, 4, 1882, p. 203, pl. 4, figs. 3-5.—Chamberlin, *ibid.*, 1, 1883, p. 141, fig.

Ozarkian (Mendota): East of Baraboo, Wisconsin.

*ILLENURUS EUREKENSIS* Walcott. See *Symphysurus eurekensis*.

***ILLENUS* Dalman.**

Genotype: *Entomostracites crassicauda* Wahlenberg.

*Ilænus* Dalman, Svenska Vet.-Akad. Handl., 1826, 1827, p. 248.—Dalman-Engelhart, Die Palaeaden, Nurnberg, 1828, p. 50.—Green, Mon. Tril. N. A., 1832, p. 18.—Portlock, Rep. Geol. Londonderry, 1843, p. 299.—Burmeister, Org. der Tril., Berlin, 1843, p. 118.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 553.—Emmrich, Neues Jahrb. f. Min., etc., 1845, p. 41.—Rouault, Bull. Soc. Geol. France, 2d ser., 4, 1847, p. 318.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5, 1847 (extract), p. 54, pl. 3, fig. 29.—McCoy, Ann. Mag. Nat. Hist. (2), 4, 1849, p. 399.—Salter, Mem. Geol. Surv. United Kingdom, dec. 2, 1849, pls. 3, 4.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 779; Syst. Sil. du Centre Boheme, 1, 1852, p. 669.—McCoy, British Pal. Rocks Fossils, 1854, p. 171.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1854, p. 41.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 514.—Nieszkowski, Archiv. f. Naturk. Liv-, Ehst- u. Kurl. (1), 1, 1857, p. 579.—Hitchcock, Geol. Vermont, 1, 1862, p. 280.—Volborth, Mem. l'Acad. Imp. Sci. St. Peters-

**ILLENUS**—Continued.

burg, 7th ser., 6, 1863, p. 2.—Chapman, Canadian Jour. n. s., 8, 1863, p. 30.—Expos. Min., Geol., Canada, 1864, p. 138.—Salter, Mon. British Tril., Pal. Soc., 1867, pp. 180, 182.—Malaise, Desc. Terr. Sil. du Centre de la Belgique, 1873, p. 85.—Steinhardt, Beit. z. Naturk. Preus. Phys.-Oekon. Gesell., Königsberg, 1874, p. 40.—Holm, Bihang K. Svenska Vet.-Hand., 7, 1882, pp. 12, 15.—Zittel, Handbuch d. Pal., 2, 1885, pp. 610, 611.—Holm, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1886, pp. 18, 20, 42.—Clarke, Jour. Morph., 2, 1888, pp. 254, 264.—Miller, N. A. Geol. Pal., 1889, p. 550. Koken, Die Leitfossilien, Leipzig, 1896, p. 28, fig. 17, figs. 1-3.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 104, pl. 3, fig. 19.—Reed, Geol. Mag., dec. 4, 1, 1898, p. 499.—Beecher, Zittel-Eastman Textb. Pal., 1, 1900, p. 630.—Grabau, Bull. New York State Mus. 45, 1901, p. 222.—Jaekel, Zeits. d. d. geol. Gesell., 53, 1901, p. 149.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 222.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, 1901, pp. 25, 26, 57.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 292.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 719.

**Illænus aboynensis** Whiteaves.

*Illænus aboynensis* Whiteaves, Geol. Surv. Can., Pal. Foss., 3, pt. 2, 1895, p. 108, pl. 15, figs. 7-8.

Niagaran (Guelph): Aboyne, Ontario.

**Illænus ambiguus** Foerste.

*Illænus ambiguus* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 106, pl. 14, figs. 9a, 9b, 10a-10c, 11; 15th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1887, p. 480, fig. 3, p. 478; Bull. Sci. Lab. Denison Univ., 2, 1887, p. 94; Proc. Boston Soc. Nat. Hist., 24, 1889, p. 267; Geol. Surv. Ohio, 7, 1893, p. 525, pl. 26, 9a-9b, 10a-10c, 11.

Upper Medinan (Brassfield): Dayton, Ohio; Hanover, Indiana.

**Illænus americanus** (Billings).

*Illænus crassicauda* Hall (not Wahlenberg), Pal. New York, 1, 1847, p. 24, pl. 4 (bis), fig. 13.—Marcou, Geol. Map U. S., Boston, 1853, p. 22, pl. 1, fig. 2.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 215, pl. 18, fig. 5; pl. 15, fig. 15; pl. 3, fig. 13; Manual Geol., 1860, p. 100, fig. 89.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 9.—Hitchcock, Geol. Vermont, 1, 1862, p. 280.—Chapman, Canadian Jour., n. s., 8, 1863, p. 30, fig. 143; p. 201, fig. 196a; Expos. Min., Geol. Canada, 1864, p. 138, fig. 143; p. 173, fig. 196a.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 322, pl. 3, fig. 1a, b.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Brainerd and Seely, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 22.—Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 716.

*Illænus americanus* Billings, Canadian Nat. Geol., 4, 1859, p. 371; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 329, fig. 316a-d, 318.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 714, figs. 20-23.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 234.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 61.—Raymond and Narraway, Ann. Carnegie Mus., 4, nos. 3, 4, 1908, pl. 60, figs. 1-3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 295, fig. 1604.

*Illænus taurus* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 49.—Meek and Worthen; Geol. Surv. Illinois, 3, 1868, p. 320, pl. 3, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 551, fig. 1017.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 73, pl. 12, figs. 4-9.—Rowley, Missouri Bur. Geol. and Mines, 2d ser., 8; 1908, p. 57, pl. 15, fig. 1.

Trenton: Ottawa, L'Original, etc., Canada; New York; Illinois; Wisconsin; Minnesota; etc.



***Illænus angusticollis* Billings.**

*Illænus angusticollis* Billings, Canadian Nat. Geol., 4, 1859, p. 376, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, fig. 113a-d.—Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 245, pl. 61, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 294.

Black River: Island of St. Joseph, Grants Island, Lake Huron; La Petite Chaudière, Hull, Canada.

**ILLÆNUS ARCTURUS** Hall. See *Thaleops arcturus*.

***Illænus arcuatus* Billings.**

*Illænus arcuatus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 279, fig. 265. Chazyan (Quebec-P): Cow Head, Newfoundland.

***Illænus argentinus* Kayser.**

*Illænus argentinus* Kayser, Zeits. d. d. geol. Gesell., 49, 1897, p. 283, pl. 7, figs. 8, 9.

Ordovician: East of Jachal, San Juan, Argentina.

**ILLÆNUS ARMATUS** Hall. See *Bumastus armatus*.

**ILLÆNUS (BUMASTUS) BARRIENSIS** Hall. See *Bumastus ioxus*.

***Illænus bayfieldi* Billings.**

*Illænus Bayfieldi* Billings, Canadian Nat. Geol., 4, 1859, p. 369, figs. 4-6; Geol. Canada, Geol. Surv. Canada, 1863, p. 133, fig. 65a-c.—Raymond, Ann. Carnegie Mus., 3, 1905, p. 348, pl. 13, figs. 11, 12; 7th Rep. Vermont State Geol., 1910, pl. 35, figs. 11, 12.

Chazyan (Mingan): Mingan Islands, Canada.

**ILLÆNUS CHICAGOENSIS** Weller. See *Bumastus chicagoensis*.

**ILLÆNUS CLAVIFRONS** Billings. See *Thaleops clavifrons*.

***Illænus conifrons* Billings.**

*Illænus conifrons* Billings, Canadian Nat. Geol., 4, 1859, p. 378, fig. 11; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, figs. 111a, b.

*Hydrolænus conifrons* Salter, Mon. British Tril., Pal. Soc., 1867, p. 182 (gen. ref.). Chazyan (Mingan): Mingan Islands, Canada.

***Illænus conradi* Billings.**

*Illænus Conradi* Billings, Canadian Nat. Geol., 4, 1859, p. 372, figs. 7-9; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, figs. 110a-c.—Vogdes, Occ. Papers California Acad. Sci., No. 4, 1893, p. 330.—Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 245, pl. 60, figs. 9, 10.

Black River (Leray): Falls of La Petite Chaudière, vicinity of Ottawa, Canada.

***Illænus consimilis* Billings.**

*Illænus consimilis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 277, 331, figs. 263a-c, 317, 318a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 294, fig. 1604a.

Chazyan (Quebec—L, M, N): Point Rich and Table Head, Newfoundland.

***Illænus consobrinus* Billings.**

*Illænus consobrinus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 280, figs. 266a, b; p. 332, footnote, figs. 320a-c.

Chazyan (Quebec—P): Cow Head, Newfoundland.

**Illænus cornigerus** Hall and Whitfield.

*Illænus cornigerus* Hall and Whitfield, 24th Rep. New York State Mus. Nat. Hist., 1872, p. 186; 27th Rep. New York State Cab. Nat. Hist., 1875, pl. 13, figs. 20, 21.

Niagaran (Louisville?): Falls of the Ohio.

**ILLÆNUS CRASSICAUDA?** Hall (1847). See *Bumastus erastusi*.

**ILLÆNUS CRASSICAUDA** of American authors. See *Illænus americanus*.

**ILLÆNUS CRASSICAUDA AMERICANA** Billings. See *Illænus americanus*.

**ILLÆNUS CUNICULUS** Hall. See *Bumastus cuniculus*.

**Illænus danielsi** Miller and Gurley.

*Illænus danielsi* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 76, pl. 7, figs. 3-5.

Niagaran: Bonfield, near Kankakee, Illinois.

**Illænus daytonensis** Hall and Whitfield.

*Illænus daytonensis* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 119, pl. 5, figs. 14-16.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 104, pl. 14, figs. 4a-4b, 6, 7a-7c; Bull. Sci. Lab. Denison Univ., 2, 1887, p. 93, pl. 8, figs. 6-7; Geol. Surv. Ohio, 7, 1895, p. 525, pl. 26, figs. 4a-4b, 6, 7a-c; pl. 27, figs. 6, 10a; Proc. Boston Soc. Nat. Hist., 24, 1889, p. 268; Jour. Geol., 11, 1903, p. 706.

Upper Medinan (Brassfield): Dayton, Fair Haven, etc., Ohio.

**Illænus depressus** Foerste.

*Illænus depressus* Foerste, Cincinnati Soc. Nat. Hist. Jour., 21, 1909, p. 33.

Clinton (West Union): Spring, Big Salt Lick Creek, and near Martins, Lewis County, Kentucky.

**ILLÆNUS ERASTUSI** Raymond. See *Bumastus erastusi*.

**Illænus fraternus** Billings.

*Illænus fraternus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 276, figs. 262a, b.

Chazy (Quebec—L, N, P): Point Rich, Table Head, and near Portland Creek, Newfoundland.

**ILLÆNUS GLOBOSUS** Billings. See *Bumastus globosus*.

**ILLÆNUS GRAFTONENSIS** Weller. See *Bumastus graftonensis*.

**Illænus grandis** Billings.

*Illænus grandis* Billings, Canadian Nat. Geol., 4, 1859, p. 380; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 27, 60 (loc. ref.).

Anticostian (Bessie River—Chicotte): Charleton Point, Gamache Bay, and Southwest Point, Anticosti.

**ILLÆNUS HARRISI** Weller. See *Bumastus harrisi*.

**ILLÆNUS HERRICKI** Foerste. See *Thaleops ovata*.

**ILLÆNUS IMPERATOR** Hall. See *Bumastus imperator*.

**Illænus incertus** Billings.

*Illænus incertus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 332, fig. 319a, b.

Canadian (Beekmantown): Stanbridge, Quebec.



**ILLÆNUS INDETERMINATUS** Raymond. See *Bumastus limbatus*.

**ILLÆNUS INDETERMINATUS** Walcott. See *Bumastus indeterminatus*.

**ILLÆNUS INSIGNIS** Hall. See *Bumastus insignis*.

**ILLÆNUS (BUMASTUS) INSIGNIS** Meek. See *Illænus springfieldensis*.

**ILLÆNUS IOXUS** Chamberlin. See *Bumastus ioxus*.

**Illænus latiaxiatus** Raymond and Narraway.

*Illænus latiaxiatus* Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 243, pl. 60, figs. 4-8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 295.

Black River: Tetreauville and Mechanicsville, near Ottawa, Canada; Pattersonville and Newport, New York.

**Illænus latidorsatus** Hall.

*Illænus latidorsatus* Hall, Pal. New York, 1, 1847, p. 230, pl. 60, figs. 6a, b.

Trenton: Near Watertown, New York.

**ILLÆNUS MADISONIANUS** Whitfield. See *Bumastus niagarensis*.

**ILLÆNUS MADISONIANUS** var. *DEPRESSA* Foerste. See *Bumastus niagarensis*.

**ILLÆNUS MADISONIANUS** var. *ELONGATUS* Foerste. See *Bumastus niagarensis*.

**ILLÆNUS MILLERI** Billings. See *Bumastus milleri*.

**ILLÆNUS (NILEUS) MINNESOTENSIS** Foerste. See *Nileus vigilans*.

**ILLÆNUS NIAGARENSIS** Whitfield. See *Bumastus niagarensis*.

**ILLÆNUS ORBICAUDA** Billings. See *Bumastus orbicaudatus*.

**ILLÆNUS ORBICAUDATUS** Billings. See *Bumastus orbicaudatus*.

**ILLÆNUS OVATUS** Hall. See *Thaleops ovata*.

**ILLÆNUS PTEROCEPHALUS** Whitfield. See *Thaleops? pterocephalus*.

**Illænus punctatus** Raymond.

*Illænus punctatus* Raymond, Annals Carnegie Mus., 3, 1905, p. 347, pl. 13, fig. 10; 7th Rep. Vermont State Geol., 1910, p. 226, pl. 35, fig. 10.

Chazy (Crown Point, Valcour): Crown Point and Valcour Island, New York.

**Illænus simulator** Billings.

*Illænus simulator* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 327, fig. 315a, b.

Canadian (Beekmantown): Stanbridge, Quebec.

**Illænus springfieldensis** Meek.

*Illænus (Bumastus) insignis?* Meek, Pal. Ohio, 1, 1873, p. 189, figs. A, B, pl. 15, figs. 5a, c.

*Illænus springfieldensis* Meek, Pal. Ohio, 1, 1873, p. 129.

Niagaran (Guelph): Springfield, Ohio.

**ILLÆNUS TAURUS** Hall. See *Illænus americanus*.

**Illænus transversalis** Weller.

*Illænus transversalis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 224, pl. 16, figs. 7-9.

Niagaran (Racine): Bridgeport, Illinois.

**ILLÆNUS TRENTONENSIS** Emmons. See *Bumastus milleri*.

**Illænus tumidifrons** Billings.

*Illænus tumidifrons* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 278, fig. 264a, b.

Chazyan (Quebec P.): Cow Head, Newfoundland.

**ILLÆNUS VINDEX** Billings. See *Thaleops vindex*.

**ILLÆNUS (BUMASTUS) WORTHENANUS** Meek and Worthen. See *Bumastus armatus*.

**INACHUS PERVETUS** Conrad. See *Euomphalus pervetus*.

**INACHUS UNDATUS** Emmons (part). See *Plectoceras? undatus*.

**INACHUS UNDATUS** Conrad (part). See *Plectoceras halli*.

**INDIANOCRINUS** Miller and Gurley. Genotype: *I. punctatus* Miller and Gurley.

*Indianocrinus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 83.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 748.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 145.

**Indianocrinus punctatus** Miller and Gurley.

*Indianocrinus punctatus* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 83, pl. 5, figs. 8–13.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 748, fig. 1362.

Niagaran (Laurel): St. Paul, Indiana.

**INOCAULIS** Hall.

Genotype: *I. plumulosa* Hall.

*Inocaulis* Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, p. 401; Pal. New York, 2, 1852, p. 176; 20th Rep. New York State Cab. Hist., 1868, p. 218, rev. ed., 1870, p. 252.—Nicholson, Mon. British Grapt., 1872, p. 131.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 33; Trans. Acad. Sci. St. Louis, 4, 1884, p. 562, 583.—Miller, N. A. Geol. Pal., 1889, p. 193.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 161.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 197.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 34.—Ruedemann, Mem. New York State Mus., 2, 1908, p. 185.

**INOCAULIS ANASTOMOTICA** Ringueberg. See *Palæodictyota anastomotica*.

**INOCAULIS ARBUSCULA** Ulrich. See *Dictyonema arbusculum*.

**INOCAULIS BELLA** Hall and Whitfield. See *Palæodictyota bella*.

**INOCAULIS CANADENSIS** Whiteaves. See *Dictyonema canadense*.

**Inocaulis cervicornis** Spencer.

*Inocaulis cervicornis* Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, 1884, p. 37, pl. 5, fig. 5; Trans. Acad. Sci. St. Louis, 4, p. 587, pl. 5, fig. 5.—Gurley, Jour. Geol., 4, 1896, pp. 99, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 51, fig. 65.

Niagaran dolomite: Hamilton, Ontario.

**Inocaulis congregatus** Gurley.

*Inocaulis congregatus* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 54, fig. 70.

Niagaran dolomite: Hamilton, Ontario.



**Inocaulis diffusus** Spencer.

*Inocaulis diffusa* Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, pp. 15, 36, 37, pl. 5, fig. 4; Trans. Acad. Sci. St. Louis, 4, pp. 565, 586, 587, pl. 5, fig. 4.—Gurley, Jour. Geol., 4, 1896, pp. 99, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 52, 53, figs. 67, 68.

Niagaran dolomite: Hamilton, Ontario.

**Inocaulis diffusus crassiramus** Gurley.

*Inocaulis diffusus crassiramus* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 53, 54, fig. 69.

Niagaran dolomite: Hamilton, Ontario.

**Inocaulis divaricatus** Hall.

*Inocaulis divaricata* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 225, pl. 1, fig. 3; Trans. Albany Inst., 10, 1883, p. 58.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 35; Trans. Acad. Sci. St. Louis, 4, 1884, p. 585.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 191.

Niagaran (Waldron): Waldron, Indiana.

**INOCAULIS FLABELLUM** James. See *Licrophycus flabellum*.**Inocaulis granti** (Dawson).

*Buthotrephis Grantii* Dawson, Quart. Jour. Geol. Soc. London, 46, 1890, p. 613, fig. 16; p. 614, fig. 17.

*Inocaulis vegetabilis* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 55 pl. 5, fig. 1.

Niagaran dolomite: Hamilton, Ontario.

**Inocaulis phycoides** Spencer.

*Inocaulis phycoides* Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, 1884, p. 38, pl. 5, figs. 6, 7, 7a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 588, pl. 5, figs. 6, 7.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 51, 52, fig. 66.

Niagaran dolomite: Hamilton, Ontario.

**Inocaulis plumulosus** Hall.

——— Hall, Rep. Surv. 4th Dist. New York, 1843, p. 116, fig. 1.

*Inocaulis plumulosa* Hall, Pal. New York, 2, 1852, p. 176, pl. 40G, figs. 2a, b; Geol. Surv. Canada, dec. 2, 1865, p. 18, fig. 26; 20th Rep. New York State Cab. Hist., 1868, p. 185, fig. 28; rev. ed., 1870, p. 215, fig. 28.—Nicholson, Mon. British Grapt., 1872, p. 132, fig. 73.—Spencer, Canadian Nat., 8, 1878, p. 458; ibid., 10, 1882, p. 166.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 34, 35, pl. 5, fig. 1; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 584, 585, pl. 5, fig. 1.—Pocta, Sil. Syst. Boheme, 8, pt. 1, 1894, p. 197.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Miller, N. A. Geol. Pal., 1889, p. 193, fig. 183.—Ruedemann, Mem. New York State Mus., 11, 1908, p. 188, pl. 2, fig. 4; pl. 7, figs. 1, 2, fig. 93.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 46–49, figs. 59–62.

Clinton (Rochester): Lockport, Rochester, etc., New York.

Niagaran dolomite: Hamilton, Ontario.

*Plesiotypes*.—Cat. No. 54281, U.S.N.M.

**INOCAULIS? PROBLEMATICA** Spencer. See *Dendrograptus? problematicus*.

**Inocaulis ramulosus** Spencer.

*Inocaulis ramulosa* Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, p. 38, 1884, pl. 6, fig. 1; Trans. Acad. Sci. St. Louis, 4, 1884, p. 588, pl. 6, fig. 1.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 49, 50, figs. 63, 64.

Niagaran dolomite: Hamilton, Ontario.

**Inocaulis? strictus** Gurley.

*Inocaulis? strictus* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 54, pl. 2, fig. 6; fig. 71.

Niagaran dolomite: Hamilton, Ontario.

**Inocaulis? thallosus** Gurley.

*Inocaulis? thallosus* (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 55, pl. 2, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

**INOCAULIS VEGETABILIS** (Gurley) Bassler. See *Inocaulis granti*.

**INOCAULIS WALKERI** Spencer. See *Acanthograptus walkeri*.

**INTRICARIA** Hall. See *Chasmatopora Eichwald*.

**IOCRINUS** Hall.

Genotype: *Actinocrinus subcrassus* Meek and Worthen.

*Iocrinus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 210 (extract 1866, p. 5).—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 285, 293 (Rev. Pal., pt. 1, pp. 62, 70); *ibid.*, 1886, p. 127; *ibid.*, 1890, p. 380; Amer. Jour. Sci., 3d ser., 26, 1883, pp. 370, 376, fig. 4.—Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 210.—Miller, N. A. Geol. Pal., 1889, p. 256, fig. 345.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 5; pl. 15, fig. 2; Kongl. Sv. Vet. Akad. Handl., 25, 1893, p. 21; Geol. Mag., dec. 4, 3, 1896, p. 73; *ibid.*, dec. 4, 6, 1899, p. 42, footnote, fig. 18; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 145, fig. 26, 1; 28; 58, 1.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 153.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 713.—Zittel, Handb. Pal., 1, 1910, p. 151.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 212.

**Iocrinus crassus** (Meek and Worthen).

*Heterocrinus crassus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 147; Geol. Surv. Illinois, 3, 1868, p. 324, pl. 4, figs. 1a-c; Geol. Surv. Illinois, 6, 1875, p. 493, pl. 23, fig. 1.

*Iocrinus crassus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 295 (Rev. Pal., pt. 1, p. 72) (gen. ref.).

Richmond (Maquoketa): Kendall County, Illinois.

**Iocrinus subcrassus** Meek and Worthen).

*Actinocrinus subcrassus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, (1), 17, 1865, p. 148.

*Heterocrinus subcrassus* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 325, pl. 4, figs. 5a-d.—Dyche, Science, 20, 1892, p. 66; Amer. Geol., 10, 1892, p. 30; Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 101.

*Heterocrinus* (*Iocrinus*) *subcrassus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, (1), 1871, 23 (3), 1, p. 310; Geol. Surv. Ohio, 1, pt. 2, p. 15, pl. 1, figs. 9a, b.



**Iocrinus subcrassus**—Continued.

*Iocrinus subcrassus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 295 (Rev. Pal., pt. 1, p. 72); *ibid.*, 1890, p. 381, pl. 10, fig. 5.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 35, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 257, fig. 346; Treatise on Zool., pt. 3, Echinoderma, London, p. 120, fig. 26, 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 726, pl. 4, figs. 7, 7a.

*Heterocrinus?* (*Iocrinus*) Polyxo Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 212, pl. 5, figs. 1-4 (extract, 1871).

Trenton-Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky.

**Iocrinus trentonensis** Walcott.

*Iocrinus trentonensis* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 210, pl. 17, figs. 7, 8.

Trenton: Trenton Falls, New York.

**ISCHADITES** Murchison.

Genotype: *Tetragonis murchisoni* Eichwald.

*Ischadites* Murchison, Siluria, 1837, p. 697.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 86.—Gumbel, Abh. d. Math.-Phys. Classe d. k. Bay. Akad. d. Wiss., 12, 1 Abth., 1875, p. 172.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 19.—Zittel, Handb. Pal., 1, 1880, p. 728.—Roemer, Leth. Geog., 1, Theil, Leth. Pal., Erste Lief, 1880, p. 291.—Hinde, Quart. Jour. Geol. Soc. London, 11, 1884, p. 810.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1886, pp. 246, 249.—Schluter, Zeits. d. d. geol. Gesell., 39, 1887, p. 7.—Geinitz, *ibid.*, 40, 1888, p. 19.—Rauff, *ibid.*, 40, 1888, p. 606.—Hinde, Mon. British Foss. Sponges, Palaeontographical Soc., 1888, p. 119.—Rauff, Abh. d. math.-phys. Classe d. k. bayer. Akad. Wiss., 18, 3, Abth., 1892, p. 692.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 61, pl. F, figs. 5-10; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 72.

*Palæospongia* D'Orbigny, Prodr. de Pal., 1, 1849, p. 26.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 540.—Bornemann, Nova Acta der Ksl. Leop.-Carol. Deutschen Akad. der Natur., 51, 1886, p. 21.—Hinde, Geol. Mag., dec. 3, 4, 1887, p. 228.—Miller, N. A. Geol. Pal., 1889, p. 162.—Rauff, Neues Jahrb. f. Min., Geol. Pal., 2, 1891, p. 92. (Genotype, ——— *cyathiformis* Hall.)

*Tetragonis* Eichwald, Urwelt. Russlands, heft 2, 1842, p. 81.—Chapman, Canadian Jour., n. s., 2, 1857, p. 304.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 386.—Roemer, Leth. Geog., 1 Theil, Leth. Pal., Erste Lief, 1880, p. 303.—Zittel, Handb. Pal., 1, 1880, p. 728.—Roemer, Zeits. d. d. Gesell., 35, 1883, pp. 705, 707.

*Selenoides* Owen, Geol. Surv. Wisconsin, Iowa, and Minnesota, 1852, p. 586.

*Dictyocrinus* Hall, Pal. New York, 3, 1859, p. 135.

*Receptaculites* (part) Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 378.

**Ischadites canadensis** Billings.

*Ischadites canadensis* Billings, Geol. Canada, 1863, p. 309, fig. 313; p. 327.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, Pal., 1895 (ext., 1893), p. 66.

*Receptaculites canadensis* Billings, Pal. Foss., 1, 1865, p. 384, fig. 363; Canadian Nat. Geol., 2d ser., 2, 1865, p. 191, fig. 10.—Roemer, Leth. Pal., 1880, p. 289.—Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 844.

Niagaran (Lockport?): Township of Esquesing, Ontario.

**Ischadites circularis** (Emmons).

*Receptaculites circularis* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 230, fig. 82; Man. Geol., 1860, p. 103, fig. 93.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 852, fig.—James, Jour. Cincinnati Soc. Nat. Hist., 14, p. 63, pt. 1.

**Ischadites circularis**—Continued.

*Ischadites circularis* Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 65.  
Lorraine shales: New York.

**Ischadites cyathiformis** (Hall).

——— *cyathiformis* Hall, Pal. New York, 1, 1847, p. 72, pl. 25, figs. 6a–6c.

*Ischadites cyathiformis* Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 65 (extr., 1893).

*Palæospongia cyathiformis* d'Orbigny, Prodr. d. Pal., 1, 1849, p. 26 (gen. ref.).

*Palæochonia cyathiformis* Fromental, Introduction Etude Eponges Foss., Caen., 1859, p. 45.

Mohawkian (Chambersburg): Carlisle, Pennsylvania.

**ISCHADITES DICKHAUTI** James. See *Lepidolites dickhauti*.

**ISCHADITES ELONGATUS** James. See *Lepidolites dickhauti*.

**ISCHADITES HEMISPHERICUS** Winchell and Marcy. See *Receptaculites hemisphericus*.

**Ischadites insularis** (Billings).

*Receptaculites? insularis* Billings, Cat. Silurian Foss. Anticosti, Geol. Surv. Canada, 1866, p. 29.—Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 846.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 61 (extr., 1893).

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

**Ischadites iowensis** (Owen).

*Selenoides iowensis* Owen, Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, p. 587, pl. 2B, fig. 13.

*Receptaculites (Selenoides) iowensis* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 14.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 385, fig. 364.—Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, pp. 68, 69.—Billings Canadian Nat. and Geol., 2d ser., 2, 1865, p. 191, fig. 11.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 852, fig.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 2, 1893, p. 64, pl. F, figs. 5–6.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 143.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 153.

*Receptaculites (Ischadites) iowensis* Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 19, fig. 30.

*Orbitulites reticulata* Owen, Geol. Rep. Iowa, Wisconsin, Illinois, 1844, pl. 18, fig. 7.

*Receptaculites reticulata* Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 11 (gen. ref.).

*Receptaculites fungosum* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 15.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 45, pl. 5, figs. 5, 6.

*Receptaculites globulare* Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 16.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 301, pl. 2, figs. 2a–b.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 44, pl. 5, fig. 7.

*Receptaculites* sp. Meek and Worthen, Geol. Surv. Illinois, 3, 1868, pt. 3, p. 301, pl. 2, figs. 1a, b.

*Ischadites kœnigii* (part) Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 836.

Trenton (Prosser-Galena): Iowa; Illinois; Wisconsin; Minnesota and Manitoba.

**ISCHADITES KÖENIGII** Hinde (part). See *Ischadites iowensis* and *I. subturbinatus*.



**Ischadites subturbinatus** Hall.

*Receptaculites subturbinatus* Hall, Trans. Albany Inst., 4, 1863, p. 224; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 103, pl. 3, figs. 1-3 (doc. ed., 1875 (1877), pl. 3, figs. 1-3); 11th Rep. State Geol. Indiana, 1882, p. 221, pl. 2, figs. 1-3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 855, text figs.

*Ischadites subturbinatus* Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895 (ext., 1893), p. 66.

*Ischadites koenigii* (part) Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 836.

Niagaran (Waldron): Waldron, Indiana.

**ISCHADITES TESSELATUS** Winchell and Marcy. See *Receptaculites tessellatus*.

**ISCHYRINIA** Billings.

Genotype: *I. winchelli* Billings.

*Ischyrinia* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 16.—Miller, N. A. Geol. Pal., 1889, p. 483.

*Ischyrinia* Clarke, Mem. New York State Mus., 6, 1904, p. 406, expl. pl. 9.

Observation.—Probably the same as *Technophorus*.

**ISCHYRINIA PLICATA** Billings. See *Technophorus plicata*.

**Ischyrinia winchelli** Billings.

*Ischyrinia winchelli* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 16, figs. 4a-4c.—Miller, N. A. Geol. Pal., 1889, p. 483, fig. 834.

Richmond (English Head and Charleton): Macasty Bay, Anticosti.

*Plastotype*.—Cat. No. 46204, U.S.N.M.

**ISCHYRODONTA** Ulrich.

Genotype: *I. truncata* Ulrich.

*Anodontopsis* (part) Meek, Amer. Jour. Sci. Arts, 3d ser., 2, 1871, p. 209; also 1873, Ohio Pal., 1, p. 141.

*Ischyrodonta* Ulrich, Amer. Geol., 6, 1890, p. 173; Geol. Surv. Ohio., 7, 1893, p. 671.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 981.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 700.

**ISCHYRODONTA CURTA** Foerste. See *Ischyrodonta unionoides*.

**Ischyrodonta decipiens** Ulrich.

*Ischyrodonta decipiens* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 673, pl. 54, figs. 16-19.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 999, pl. 45, figs. 3-3c.

Richmond (Elkhorn): Near Richmond, Indiana.

*Cotypes*.—Cat. Nos. 46205, 46206, U.S.N.M.

**Ischyrodonta elongata** Ulrich.

*Ischyrodonta elongata* Ulrich, Amer. Geol., 6, 1890, p. 175, figs. 12a-c; Geol. Surv. Ohio, 7, 1893, p. 675, pl. 54, figs. 20, 21.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1000, pl. 45, figs. 4, 4a.

Richmond (Whitewater): Oxford, Ohio; Richmond, Indiana.

*Holotype* and *plesiotype*.—Cat. Nos. 46207, 46208, U.S.N.M.

**Ischyrodonta miseneri** Ulrich.

*Ischyrodonta miseneri* Ulrich, Rep. Geol. Surv. Ohio, 7, 1893, p. 675, pl. 54, figs. 10, 11.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1001, pl. 45, figs. 5, 5a.

*Cypriocardites miseneri* Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Richmond (Whitewater): Richmond, Indiana.

*Holotype*.—Cat. No. 46209, U.S.N.M.

**Ischyrodonta modioliformis** Ulrich.

*Ischyrodonta modioliformis* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 676, pl. 54, figs. 4-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1001, pl. 45, figs. 6, 6e.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416, fig. 539.

Richmond (Whitewater): Richmond, Indiana.

*Cotypes*.—Cat. No. 46210, U.S.N.M.

**Ischyrodonta ovalis** Ulrich.

*Ischyrodonta ovalis* Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 242, fig. 27; Geol. Surv. Ohio, 7, 1893, p. 674, pl. 54, figs. 12-15; Geol. Minnesota, 3, pt. 2, 1894, p. 477, fig. 35.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1002, pl. 45, figs. 7-7b.

*Cypriocardites ovalis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Richmond (Whitewater): Near Richmond, Indiana.

*Holotype*.—Cat. No. 46211, U.S.N.M.

**Ischyrodonta truncata** Ulrich.

*Ischyrodonta truncata* Ulrich, Amer. Geol., 6, 1890, p. 174, fig. 11.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 700, fig. 1258.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 672, fig. 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1003, pl. 45, figs. 8-8c.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416, fig. 540.

Richmond (Whitewater): Oxford, Ohio, and Richmond, Indiana.

*Cotypes*.—Cat. No. 46212, U.S.N.M.

**Ischyrodonta unionoides** (Meek).

*Anodontopsis? unionoides* Meek, Amer. Jour. Sci. Arts, 2, 1871, p. 299.

*Anodontopsis* (*Modiolopsis*?) *unionoides* Meek, Pal. Ohio, 1, 1873, p. 141, pl. 12, figs. 2a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 227.

*Modiolopsis unionoides* Miller, N. Amer. Geol. Pal., 1890, p. 491 (gen. ref.).

*Ischyrodonta unionoides* Ulrich, Geol. Surv. Ohio, 7, 1893, p. 677, pl. 54, figs. 1-3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1004, pl. 46, figs. 1, 1a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416, fig. 538.

*Ischyrodonta curta* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 298, pl. 3, fig. 14.

Maysville (Bellevue): Cincinnati, Ohio, and vicinity. Pulaski shales of New York and Canada.

*Plesiotypes*.—Cat. No. 46213, U.S.N.M.

**ISOARCA** LOGANI Woodward. See *Ctenodonta nasuta*.

**ISOCHILINA** Jones.

Genotype: *Lepeditia ottawa* Jones.

*Isochilina* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 97; Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 248; Monthly Microsc. Jour., 4, 1870, p. 191.—Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 533.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 21, No. 2, 1873, p. 8.—Zittel, Handb. Pal., 2, 1885, p. 552.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 22, pl. 2, fig. 18.—Miller, N. A. Geol. Pal., 1889, p. 551.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 307.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 643.—Grabau, Bull. New York State Mus., 45, 1901, p. 218; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 218.—Jaekel, Zeits. geol. Gesell., 53, 1901, p. 149.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 341.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 737.



*ISOCHILINA AMIANA* Ulrich. See *Isochilia gregaria*.

*ISOCHILINA AMIANA* var. *INSIGNIS* Ulrich. See *Isochilina cristata*.

***Isochillina amii* Jones.**

*Isochilina Amii* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 68, pl. 10, figs. 14a, -b.

Trenton: Lorette, Quebec.

***Isochillina ampla* Ulrich.**

*Isochilina ampla* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 179, pl. 11, figs. 8a-d.

Trenton (Catheys): Nashville, Tennessee.

*Cotypes*.—Cat. No. 41291, U.S.N.M.

***Isochillina armata* (Walcott).**

*Leperditia (Isochilina) armata* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 213, pl. 17, fig. 10 (extract, 1883, p. 7).

*Isochilina kentuckiensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 179, pl. 11, figs. 11a-11d.

Black River (Lowville): Russia, Herkimer County, New York; High Bridge and Frankfort, Kentucky.

*Plesiotype*.—Cat. No. 43155, U.S.N.M. (Holotype of *I. kentuckiensis*.)

***Isochillina armata pygmæa* Ruedemann.**

*Isochilina armata pygmæa* Ruedemann, Bull. New York State Mus., 49, 1901, p. 72, pl. 7, figs. 19-25.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

***Isochillina? clavigera* (Jones).**

*Beyrichia clavigera* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 65, pl. 11, fig. 7.

*Isochilina? clavigera* Ulrich and Baessler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 3.

Stones River (Pamelia): Aylmer, Quebec.

*Plesiotype*.—Cat. No. 41653, U.S.N.M.

***Isochillina clavigera clavifracta* (Jones).**

*Beyrichia clavigera clavifracta* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 65, pl. 11, fig. 8.

Stones River (Pamelia): Aylmer, Quebec.

***Isochillina cristata* (Whitfield).**

*Primitia? cristata* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 59, pl. 13, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1889, p. 743, figs.

*Isochilina cristata* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 23, pl. 1, fig. 8.—Seely, Vermont State Geol., Rep., 7, 1910, pl. 61, fig. 15.

*Isochilina amiana* var. *insignis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 181, pl. 11, fig. 13.

Canadian (Beekmantown): Cave Island, Ball's Bay, Lake Champlain; drift at Ottawa, Ontario.

*Plesiotype*.—Cat. No. 41290, U.S.N.M. (Holotype of *I. amiana insignis*.)

*ISOCHILINA CYLINDRICA* Grabau. See *Leperditia cylindrica*.

***Isochillina gracilis* (Jones).**

*Leperditia (Isochilina) gracilis* Jones, Ann. Mag. Nat. Hist. (3), 1, 1858, p. 248, pl. 10, fig. 2; Geol. Surv. Canada, dec. 13, 1858, p. 98, pl. 11, fig. 15.

***Isochilina gracilis*—Continued.**

- Isochilina gracilis* Jones, Monthly Micros. Jour., 4, 1870, p. 185, pl. 61, fig. 18.—  
Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76.  
Trenton or Black River: White Horse Rapids, Isle Jesus, Canada.

***ISOCHILINA GRANDIS* JONES.** See *Isochilina grandis latimarginata*.

***Isochilina grandis latimarginata* (Jones).**

- Leperditia marginata*? Jones (not Keyserling), Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 94, 100, pl. 7, figs. 14a-d.  
*Isochilina grandis* Jones (not Schrenk), Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 347; *ibid.*, 9, 1882, p. 171.  
*Isochilina grandis* var. *latimarginata* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 78, pl. 10, figs. 1-4.  
Niagaran: Long Point, Lake Winnepegosis, Cedar Lake, and Saskatchewan River, Canada.

***Isochilina gregaria* (Whitfield).**

- Primitia gregaria* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 58, pl. 13, figs. 3-5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 743, figs.  
*Isochilina gregaria* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 22, pl. 1, figs. 9, 10.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 61, figs. 16, 17.  
*Isochilina ottawa* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 551.  
*Isochilina Ottawa* var. *intermedia* Jones, Contr. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 66, pl. 10, figs. 10a, b, 11a, b.  
*Isochilina amiana* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 180, pl. 11, figs. 12a-c.  
Canadian (Beekmantown): Cave Island, Ball's Bay, Vermont; drift at Ottawa, Ontario.  
*Plesiotype*.—Cat. No. 41289, U.S.N.M. (Holotype of *I. amiana*.)

***Isochilina gregaria ulrichiana* Jones.**

- Isochilina gregaria ulrichiana* Jones, Geol. Mag., dec. 4, 10, 1903, p. 301, figs. 1, 2a, b.  
Trenton(?): Hamilton, Ontario (drift).

***Isochilina jonesi* Wetherby.**

- Isochilina jonesi* Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 80, pl. 2, figs. 7, 7a.—Miller, N. A. Geol. Pal., p. 552, fig. 1018.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 179, pl. 11, figs. 9a-c.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 342, figs. 16561-n.  
Trenton (Perryville): Mercer County, Kentucky.

***ISOCHILINA KENTUCKIENSIS* Ulrich.** See *Isochilina armata*.

***ISOCHILINA LABELLOSA* Jones.** See *Leperditella? labellosa*.

***Isochilina labrosa* Jones.**

- Isochilina labrosa* Jones, Ann. Mag. Nat. Hist., 6th ser, 3, 1889, p. 383, figs. 3, 4; pl. 17, fig. 11.—Chapman, Proc. Roy. Soc. Victoria, n. s., 17, pt. 1, 1904, p. 299, pl. 16, fig. 3.  
Silurian: Cap Bon Ami, New Brunswick; ?Cave Hill, Lilydale, Victoria.

***Isochilina musculosa* Foerste.**

- Isochilina musculosa* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 30, pl. 1, fig. 2.  
Cayugan (Kokomo): Kokomo, Indiana.



***Isochillina ottawa* (Jones).**

- Leperditia* (*Isochilina*) *Ottawa* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 243, pl. 10, fig. 1; Geol. Surv. Canada, dec. 3, 1858, p. 97, pl. 11, fig. 14.  
*Isochilina ottawa* Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 345; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 66.  
*Leperditia Ottawa* Dwight, Vassar Bros. Inst., 5, 1890, p. 76.  
 Canadian (Beekmantown): Grenville, Quebec.

*ISOCHILINA OTTAWA* var. Jones. See *Isochilina gregaria*.

*ISOCHILINA OTTAWA* var. *INTERMEDIA* Jones. See *Isochilina gregaria*.

***Isochillina panolensis* Foerste.**

- Isochilina panolensis* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 328; Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 30, pl. 1, fig. 1.  
 Clinton (Waco): Panola and near Irvine, Kentucky.

***Isochillina saffordi* Ulrich.**

- Isochilina saffordi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 178, pl. 11, figs. 10a-d.  
 Trenton (Catheys): Nashville, Tennessee.  
*Holotype*.—Cat. No. 41288, U.S.N.M.

*ISOCHILINA SCOFIELDI* Miller. See *Macronotella scofieldi*.

***Isochillina seelyi* (Whitfield).**

- Primitia Seelyi* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 60, pl. 13, figs. 6, 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 744, figs.  
*Isochilina seelyi* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 22, pl. 1, fig. 7.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 61, fig. 17.  
 Canadian (Beekmantown): Shoreham, Vermont; Providence Island, Lake Champlain.

***Isochillina? subnodosa* Ulrich.**

- Isochilina subnodosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 177, pl. 11, figs. 7a-c.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 342, figs. 1656i-k.  
 Trenton (Perryville): Perryville, etc., Kentucky.  
*Holotype*.—Cat. No. 41294, U.S.N.M.

***Isochillina whiteavesi* Jones.**

- Isochilina whiteavesi* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 68, pl. 10, figs. 13a, b.  
 Trenton: Lorette Falls, Quebec.

*ISOGRAPTUS GIBBERULUS* Moberg. See *Didymograptus (Isograptus) caduceus*.

***ISOTELOIDES* Raymond.**

Genotype: *I. whitfieldi* Raymond.

- Isoteloides* Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, pp. 36, 67; 7th Rep. Vermont State Geol., 1910, p. 223; Trans. and Proc. Roy. Soc. Canada, 5, 3d ser., sec. 4, 1912, p. 115.

***Isoteloides angusticaudus* (Raymond).**

- Isotelus angusticaudus* Raymond, Ann. Carnegie Mus., 3, 1905, p. 345, pl. 13, figs. 3, 4.  
*Isoteloides angusticaudus* Raymond, 7th Rep. Vermont State Geol., 1910, p. 223, pl. 35, figs. 3, 4; pl. 37, fig. 7; pl. 38, fig. 1; pl. 39, fig. 8; Ann. Carnegie Mus., 7, 1910, p. 68, pl. 17, fig. 7; pl. 18, fig. 1; pl. 19, fig. 8.—Perkins, Rep. Vermont State Geol., 8th ser., 1912, pl. 18, fig. 1.  
 Chazy (Crown Point, Valcour): Valcour Island and Chazy, New York; Isle La Motte, Vermont.

**Isoteloides homalonotoides** (Walcott).

*Asaphus homalonotoides* Walcott, 31st Rep. New York State Mus. Nat. Hist., 1879, 1880, adv. sheets Sept. 20, 1877, p. 70.—Whitfield, Geol. Wisconsin, 4, 1882, p. 237, pl. 5, fig. 4.

*Asaphus triangulatus* Whitfield, Ann. Rep. for 1879, Wisconsin Geol. Surv., 1880, p. 59.

*Isoteloides homalonotoides* Raymond, Ann. Carnegie Mus., 7, 1910, p. 52, pl. 16, figs. 9–11.

Black River: Dunleith, Illinois; Grant County, Wisconsin; Pattersonville, New York; Ottawa, Canada.

Trenton: Smiths Basin, New York.

**Isoteloides whitfieldi** Raymond.

*Asaphus canalis* Whitfield (not Hall), Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 336, pl. 34, figs. 1–8; *ibid.*, 2, 1889, p. 64, pls. 11, 12.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 58.

*Isotelus canalis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 291, fig. 1600.

*Isoteloides whitfieldi* Raymond, Ann. Carnegie Mus., 7, 1910, p. 36, pl. 16, figs. 1–4, fig. 4.

Canadian (Beekmantown): Crown Point, New York; Fort Cassin, Vermont.

**ISOTELUS** DeKay.

Genotype: *I. gigas* DeKay.

*Isotelus* DeKay, Ann. Lyceum Nat. Hist. New York, 1, p. 174.—Green, Mon. Tril. N. A., 1832, pp. 17, 64.—Edwards, Hist. Nat. d. Crust., 3, 1840, p. 297.—Portlock, Rep. Geol. Londonderry, 1843, p. 293.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 554.—McCoy, Ann. Mag. Nat. Hist., (2), 4, 1849, p. 399; British Pal. Rocks, Fossils, 1854, p. 169.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 215.—Salter, Mem. Geol. Surv. United Kingdom, dec. 11, 1864, pl. 3; Mon. British Tril., Pal. Soc., 1866, p. 147.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 137.—Zittel, Handb. Pal., 2, 1885, p. 608.—Brögger, Afh. Sveriges Geol. Unders., ser. C, No. 82, 1886, p. 31; Bihang till K. Sven. Vet.-Akad. Handl., 11, No. 3, 1886, p. 31.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 700.—Koken, Die Leitfossilien, Leipzig, 1896, p. 28.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 8th ser., 6, 1898, pp. 11, 12, 33.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1052.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 291.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 47.—Raymond, Trans. and Proc. Roy. Soc. Canada, 5, 3rd ser., sec. 4, 1912, p. 115; Zittel-Eastman Textb. Pal., 1913, p. 719.

**ISOTELUS ALACER** Billings. See *Brachyaspis alacer*.

**ISOTELUS ANGUSTICAUDUS** Raymond. See *Isoteloides angusticaudus*.

**Isotelus arenicola** Raymond.

*Isotelus arenicola* Raymond, Ottawa Nat., 24, 1910, p. 130, figs. 1, 2 (?pl. 2, fig. 5). Chazy (Aylmer): Deschenes and Britannia, near Ottawa, and West Hawkesbury, Canada.

**ISOTELUS? BEARSI** Raymond. See *Vogdesia bearsi*.

**Isotelus benjamini** Ulrich.

*Isotelus benjamini* Ulrich in Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 144, fig. 4.

Trenton (Upper): Covington and Rogers Gap, Kentucky.



**Isotelus beta** Raymond.

*Asaphus* sp. *beta* Raymond, Ann. Carnegie Mus., 3, 1905, p. 342, pl. 12, fig. 9.

*Isotelus beta* Raymond, 7th Rep. Vermont State Geol., 1910, pl. 36, fig. 9, pl. 39, figs. 4-7; Ann. Carnegie Mus., 7, 1910, p. 67, pl. 19, figs. 4-7.

Chazyan (Crown Point, Valcour): Crown Point, Valcour Island, Plattsburgh, and Chazy, New York.

**Isotelus canalis** Hall.

*Isotelus canalis* (Conrad MS.) Hall, Pal. New York, 1, 1847, p. 25, pl. 4 (bis), figs. 17-19.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 236, pl. 3, figs. 17-19.

*Asaphus canalis* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70 (gen. ref.).—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 270, figs. 255a, b; p. 352, fig. 340.

Chazyan: Chazy, New York; Newfoundland.

Observation.—Neither defined nor figured so as to be recognized.

**ISOTELUS CANALIS** Clarke. See *Isotelus gigas*.

**ISOTELUS CANALIS** Grabau and Shimer. See *Isoteloides whitfieldi*.

**ISOTELUS CANALIS** Weller. See *Asaphellus gyracanthus*.

**Isotelus covingtonensis** Ulrich.

*Isotelus covingtonensis* Ulrich in Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 145, figs. 1, 2.

Trenton (Upper): Covington, Rogers Gap, etc., Kentucky.

**Isotelus cyclops** Green.

*Isotelus cyclops* Green, Monthly Amer. Jour. Geol., 2, 1832, p. 560, pl., fig. 7;

Mon. Tril. N. A., 1832, p. 69, fig. 7, cast 24.

Middle Ordovician: Western New York.

*Plastotype*.—Cat. No. 25703, U.S.N.M.

**ISOTELUS EMORYI** Walcott. See *Onchometopus emoryi*.

**ISOTELUS FLORENCEVILLENIS** Calvin. See *Onchometopus susae*.

**ISOTELUS GIGAS** of authors. See *Isotelus jacobus*, *I. latus*, and *I. iowensis*.

**Isotelus gigas** deKay.

*Isotelus gigas* DeKay, Annals Lyceum Nat. Hist. New York, 1, 1824, p. 176, pl.

12, fig. 1; pl. 13, fig. 1.—Green, Monthly Amer. Jour. Geol., 1832, p. 560; Mon.

Tril. N. A., 1832, p. 71, cast 21, 22.—Milne-Edwards, Crust., 3, 1840, p. 298.—

Troost, 5th Geol. Rep. Tennessee, 1840, p. 57.—Vanuxem, Nat. Hist. New

York, Geol., 3, 1842, p. 47, fig. 1.—Emmons, *ibid.*, 2, 1842, p. 389, fig. 1.—

Mather, *ibid.*, 1, 1843, p. 397, fig. 1.—Goldfuss, Neues Jahrb. f. Min., etc.,

1843, p. 554.—Owen, Amer. Jour. Sci., 47, 1844, p. 363, fig. 1.—Hall, Pal.

New York, 1, 1847, p. 25, pl. 4 (bis), fig. 16; p. 231, pl. 60, figs. 7a-i; pl. 61,

figs. 3a-f, 3i-m, 4a-c; pl. 62, figs. 1a-c, 2; pl. 63; also p. 254, pl. 66, fig. 5.—

Emmons, Amer. Geology, 1, pt. 2, 1855, p. 215, pl. 16, figs. 9-12.—Billings,

Canadian Nat. Geol., 1, 1856, pp. 45, 46, figs. 9, 11.—Rogers, Geol. Pennsyl-

vania, 2, pt. 2, 1858, p. 819, fig. 610.—Emmons, Man. Geol., 1860, p. 100,

fig. 89.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3,

fig. 11.—Hitchcock, Geol. Vermont, 2, 1862, pl. 12, fig. 5.—Chapman, Expos.

Min., Geol. Canada, 1864, p. 136, fig. 140.—Lesley, Geol. Surv. Pennsylvania,

Rep. P 4, 1889, p. 302, figs.—Clarke, Geol. Minnesota, 3, pt 2, 1894, p. 701,

figs. 6-8; p. 706.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 174.—Weller,

Geol. Surv. New Jersey, Pal., 3, 1903, p. 192, pl. 14, figs. 6, 7.—Grabau and

Shimer, N. A. Index Fossils, 2, 1910, p. 292, fig. 1601.—Raymond, Ann.

**Isotelus gigas**—Continued.

- Carnegie Mus., 7, 1910, p. 53, pl. 15, figs. 1, 2.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 116, pl. 10, fig. 1.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 47.—Raymond, Roy. Soc. Canada, Trans. and Proc., 3d ser., 5, sec. 4, 1912, p. 119, pl. 2, figs. 7, 9; p. 120, pl. 3, fig. 6; Bull. Mus. Comp. Zool., 58, 1914, p. 248, pl. 1, figs. 1, 2; pl. 2, figs. 2-5; pl. 3, fig. 3.
- Asaphus gigas* Dalman, K. K. Akad. Handl. for 1826, 1827, p. 276.—Packard, Amer. Nat., 14, 1880, pp. 505-508, figs. 2-4.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 153, pl. 10, figs. 18, 19.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Miller, N. A. Geol. Pal., 1889, p. 531, fig. 967.—Rowley, Missouri Bur. Geol., Mines, 2d ser., 8, 1908, p. 57, pl. 15, fig. 2.
- Asaphus (Isotelus) gigas* Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 41, fig. 5.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 138.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 232.
- Asaphus platycephalus* Stokes, Trans. Geol. Soc. London, 2d ser., 1, 1824, p. 208.—Bronn, Leth. Geog., 1, 1835, p. 115, pl. 9, fig. 8.—Green, Amer. Jour. Sci., 37, 1839, p. 37.—Buckland, Bridgw. Treatise, 2, 1840, p. 76, pl. 63, fig. 12.—Burmeister, Org. Tril., 1846, p. 110, pl. 2, fig. 12 (Roy. Soc. ed., 1846).—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 219, fig. 229.—Chapman, Canadian Jour., n. s., 4, 1859, p. 142; 8, 1863, p. 29, fig. 140; p. 200, fig. 196; Expos. Min. and Geol., 1864, p. 172, fig. 196.—Billings, Canadian Nat., 1864 (2), 1, 1864, p. 370.—Woodward, Quart. Jour. Geol. Soc. London, 26, 1870, p. 487, fig. 1.—Dana, Amer. Jour. Sci., 3d ser., 1, 1871, pp. 320, 386; Ann. Mag. Nat. Hist., 4th ser., 7, 1871, p. 366.—Woodward, Geol. Mag., 8, 1871, pl. 8, fig. 1.—Dana, Canadian Nat., n. s., 6, 1872, p. 348.—Eichwald, Neues Jahrb. f. Min. Geol. Pal., 1873, p. 1, pl. 1.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875 (1877), footnote, p. 95; *ibid.*, mus. ed., 1879; 31st Rep. New York State Mus. Nat. Hist., 1879, pp. 62, 64; Bull. Mus. Comp. Zool., 8, 1881, pp. 191-216, pl. 2, fig. 9; Science, 3, 1884, p. 281.—Woodward, Geol. Mag., dec. 3, 1, 1884, p. 78, text fig.
- Asaphus (Isotelus) platycephalus* Burmeister, Org. der Tril., Berlin, 1843, p. 127, pl. 2, fig. 12.
- Isotelus platycephalus* Bronn and Roemer, Leth. Geog., 1, 1851-56, p. 632, pl. 9, fig. 8; pl. 9', fig. 5.
- Isotelus planus* DeKay, Ann. Lyceum Nat. Hist. New York, 1, 1824, p. 178, pl. 13, fig. 2.—Green, Monthly Amer. Jour. Geol., 1832, p. 560; Mon. Tril. N. A., 1832, p. 68, cast 23.—Goldfuss, Neues Jahrb. f. Mem., etc., 1843, pl. 554.
- Asaphus planus* Dalman, K. K. Akad. Handl., 1827, p. 276.
- Isotelus stagops* Green, Mon. Tril. N. A., 1832, p. 71, cast 26, 27.
- Brongniatia isotelea* Eaton, Geol. Textb., 2d ed., 1832, p. 33, pl. 2, fig. 22.
- Asaphus Murchisoni* Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 19, pl. 4, fig. 3.
- ?*Isotelus canalis* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 707, fig. 9.
- Mohawkian and Cincinnati: United States and Canada.
- Observation.—Several distinct species are undoubtedly recorded in the above citations. (See Raymond, 1914.)

**Isotelus harrisi** Raymond.

- Isotelus harrisi* Raymond, Annals Carnegie Mus., 3, 1905, p. 343, pl. 12, figs. 3, 5, 7.—Schmidt, Mem. Imp. Acad. Sci., St. Petersburg, 20, 1907, p. 75.—Raymond, 7th Rep. Vermont State Geol., 1910, p. 221, pl. 34, figs. 3, 5-7; pl. 37, fig. 1; Ann. Carnegie Mus., 7, 1910, p. 65, pl. 17, fig. 1, fig. 2.
- Chazy: Crown Point, Valcour Island, Chazy, and Coopersville, New York; Isle La Motte. Vermont (Crown Point, Valcour); Mingan Islands, Canada (Mingan).



*Isotelus harrisi* Raymond (part). See *Isotelus platymarginatus*.

***Isotelus iowensis* (Owen).**

*Asaphus* (*Isotelus*) *iowensis* Owen, Rep. Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, p. 577, tab. 2A, figs. 1-7.—Lesley, Geol. Surv. Pennsylvania Rep., P 4, 1889, p. 41, figs.

*Isotelus iowensis* Clarke, Geol. Minnesota, 3 pt., 2, 1894, p. 704.—Slocom, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 48, pl. 13, figs. 1, 2.—Raymond, Bull. Mus. Comp. Zool., 58, 1914, p. 255, pl. 2, fig. 6; pl. 3, figs. 1, 2.

*Isotelus gigas* Clarke (part), Geol. Minnesota, 3, pt. 2, 1894, p. 703, fig. 5.—Weller, Geol. Surv. New Jersey, Pal., 3, 1902, pl. 14, fig. 5.

Richmond (Maquoketa): Turkey River, Clermont, and Elgin, Iowa.

*Cotypes*.—Cat. No. 17906, U.S.N.M.

***Isotelus jacobus* Clarke.**

*Isotelus gigas* Hall (part), Pal. New York, 1, 1847, pl. 61, figs. 3g, 3b.

*Isotelus jacobus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 706, footnote.

Trenton: Middleville, New York.

***Isotelus latus* Raymond.**

*Isotelus latus* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 45, pl. 5.

*Asaphus platycephalus* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 184, text fig. 183; Cat. Sil. Foss. Anticosti, 1866, p. 24, fig. 7; Quart. Jour. Geol. Soc. London, 26, 1870, p. 486, pls. 31, 32.

*Isotelus gigas* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 293, fig. 1602.

Trenton: Ottawa, Ontario.

***Isotelus longævus* Savage.**

*Isotelus longævus* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 103, pl. 6 fig., 15.

Upper Medinan (Edgewood): Near Edgewood, Illinois.

***Isotelus maximus* Locke.**

*Isotelus maximus* Locke, 2d Ann. Rep. Geol. Surv. Ohio, 1838, p. 246, figs. 8, 9; Amer. Jour. Sci., 41, 1841, p. 161; Trans. Assoc. Amer. Geol. and Nat., 1843, p. 14.—Clarke, 10th Rep. State Geol. New York for 1890, 1891, p. 87; 44th Rep. New York State Mus., 1892, p. 111; Geol. Minnesota, 3, pt. 2, 1894, p. 701, figs. 5-7; p. 706.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 59, pl. 4, fig. 1.—Raymond and Narraway, Ann. Carnegie Mus., 7, 1910, p. 55, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 292, fig. 1603.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1060, pl. 55, fig. 1.—Slocom, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 47.—Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 46, pl. 4, fig. 8; Bull. Mus. Comp. Zool., 58, 1914, p. 257.

*Asaphus maximus* Clarke, 46th Rep. New York State Mus., 1893, p. 195; 12th Rep. State Geol. New York for 1892, 1894, p. 49.

*Asaphus* (*Isotelus*) *maximus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 233.

*Isotelus megistos* Locke, Amer. Jour. Sci., 42, 1842, p. 366, pl. 3, fig.; Trans. Assoc. Amer. Geol., Nat., 1843, p. 221, pl. 6, fig. 1.—Anon., Amer. Jour. Sci., 2d ser., 6, 1848, p. 431.—Taylor, *ibid.*, 10, 1850, p. 113.

*Asaphus megistos* Chapman, Canadian Jour., n. s., 4, 1859, pp. 140, 142.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 184, fig. 182; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 26, 60.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 89; mus. ed., 1879, p. 89.—Mickelborough, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, pp. 200-206, figs. 1, 3 (2).—

**Isotelus maximus**—Continued.

Walcott, Science, 3, 1884, p. 280, fig. 1.—Woodward, Geol. Mag., 3, 1, 1884, p. 162, figs. 1-3.—Ford and Dwight, Amer. Jour. Sci., 3d ser., 31, 1886, p. 254, pl. 7, fig. 16.—Miller, N. A. Geol. Pal., 1889, p. 531, fig. 968.—Beecher, Amer. Jour. Sci., 4th ser., 13, 1902, p. 169, pl. 5, figs. 5, 6; Geol. Mag., dec. 4., 9, 1902, p. 158, figs. 5, 6.—Rowley, Missouri Bur. Geol. and Mines, 2d ser., 8, 1908, p. 58, pl. 15, fig. 3.

*Asaphus* (*Isotelus*) *megistos* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 159, pl. 14, fig. 13.—Miller, Cincinnati Quart., Jour. Sci., 1, 1874, p. 137.

Trenton-Richmond: Cincinnati, Ohio. Many localities in the United States and Canada.

*Plesiotype*.—Cat. No. 33458, U.S.N.M. (Mickelborough).

Observation.—The above citations, like those of *I. gigas*, probably refer to several species.

**Isotelus megalops** Green.

*Isotelus megalops* Green, Mon. Tril. N. Amer., 1832, p. 70, cast No. 25.

Trenton: Near Trenton Falls, New York.

*Plastotype*.—Cat. No. 25694, U.S.N.M.

**ISOTELUS MEGISTOS** Locke. See *Isotelus maximus*.

**ISOTELUS OBTUSA** Raymond. See *Onchometopus obtusus*.

**ISOTELUS PLANUS** DeKay. See *Isotelus gigas*.

**ISOTELUS PLATYCEPHALUS** Bronn. See *Isotelus gigas*.

**Isotelus platymarginatus** Raymond.

*Isotelus harrisi* (part) Raymond, Ann. Carnegie Mus., 3, 1905, pl. 12, fig. 4.

*Isotelus platymarginatus* Raymond, Ann. Carnegie Mus., 7, 1910, p. 66, pl. 17, figs. 2-5; pl. 19, fig. 3; 7th Rep. Vermont State Geol., 1910, p. 225, pl. 34, fig. 4; pl. 37, figs. 2-5; pl. 39, fig. 3.

Chazy (Crown Point, Valcour): Valcour Island, New York; Isle La Motte, Vermont.

**ISOTELUS STEGOPS** Green. See *Isotelus gigas*.

**ISOTELUS SUSÆ** Clarke. See *Onchometopus susæ*.

**ISOTRYPA AMBIGUA** Ulrich. See *Loculipora ambigua*.

**JAKELOCYSTIS** Schuchert.

Genotype: *J. hartleyi* Schuchert.

*Jaekelocystis* Schuchert, Amer. Geol., 32, 1903, p. 230; Smiths. Misc. Coll., 47, 1904, p. 222.

**Jaekelocystis avellana** Schuchert.

*Jaekelocystis avellana* Schuchert, Smiths. Misc. Coll., 47, 1904, p. 226, pl. 37, figs. 11, 12, fig. 28; Maryland Geol. Surv., Low. Dev., p. 235, pl. 38, figs. 3, 4.

Helderbergian (Keyser): Keyser, West Virginia.

*Holotype*.—Cat. No. 35056, U. S. N. M.

**Jaekelocystis hartleyi** Schuchert.

*Jaekelocystis hartleyi* Schuchert, Amer. Geol., 32, 1903, p. 231; Smiths. Misc. Coll., 47, pt. 2, 1904, p. 224, fig. 27, pl. 37, figs. 4-8.—Grabau and Shimer,

N. A. Index Fossils, 2, 1910, p. 468, fig. 1776.—Schuchert, Maryland Geol. Surv., Low. Dev., 1913, p. 233, pl. 37, figs. 12-16.

Helderbergian (Keyser): Keyser, West Virginia.

*Cotypes*.—Cat. No. 35055, U. S. N. M.



**Jaekelocystis papillatus** Schuchert.

*Jaekelocystis papillatus* Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 225, pl. 37, figs. 9, 10; *Maryland Geol. Surv., Low. Dev.*, 1913, p. 234, pl. 38, figs. 1, 2. Helderbergian (Keyser): Keyser, West Virginia.  
*Holotype* and *paratype*.—Cat. No. 35057, U.S.N.M.

**JONESELLA** Ulrich.Genotype: *J. crepidiformis* Ulrich.

*Jonesella* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 121.—Miller, N. A. *Geol. Pal.*, 1st App., 1892, p. 708.—Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 667.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 349.—Bassler, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 738.

**JONESELLA CRASSA** Ulrich. See *Ctenobolbina crassa*.

**Jonesella crepidiformis** (Ulrich).

*Leperditia crepidiformis* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1879, p. 10, pl. 7, figs. 3, 3a.

*Jonesella crepidiformis* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 122, pl. 7, figs. 8a-c; *Geol. Minnesota*, 3, pt. 3, 1894, p. 667, figs. 47a-c.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 349, figs. 1658a-c.—Bassler, *Zittel-Eastman Textb. Pal.*, 1913, p. 738, fig. 1425f.

Eden (Economy): Covington, Kentucky, and vicinity.  
*Cotypes*.—Cat. No. 41359, U.S.N.M.

**Jonesella digitata** Ulrich.

*Jonesella digitata* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 122, pl. 7, figs. 10a-c.

Richmond (Arnheim): Marion County, Kentucky.  
*Holotype*.—Cat. No. 41358, U.S.N.M.

**Jonesella obscura** Ulrich.

*Jonesella obscura* Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 668, pl. 44, figs. 17-19. Trenton (Prosser): Cannon Falls, Minnesota.  
*Cotypes*.—Cat. No. 41529, U.S.N.M.

**Jonesella pedigera** Ulrich.

*Jonesella pedigera* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 122, pl. 7, figs. 9a, 9b; *Geol. Minnesota*, 3, pt. 2, 1894, p. 667, figs. 47d, e.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 349, figs. 1658d, e.

Eden (Economy): Covington, Kentucky, and vicinity.  
*Holotype*.—Cat. No. 41360, U.S.N.M.

**JOVELLANIA** Bayle.Genotype: *Orthoceras buchi* Verneuil.

*Jovellania* Bayle, *Bull. Soc. Geol. France*, 3d ser., 7, 1879, p. 91.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 326; *ibid.*, 2, 1891, p. 397.

**JOVELLANIA CAPITOLINUM** Foord. See *Actinoceras? cuvieri*.

**Jovellania murrayi** (Billings).

*Orthoceras murrayi* Billings, *Geol. Surv. Canada, Rep. Progr. for 1853-56*, 1857, p. 332.

*Jovellania murrayi* Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 328, fig. 50. Black River: St. Joseph's Island, Lake Huron.

**Jovellania semiplanata** (Whiteaves).

*Orthoceras semiplanatum* Whiteaves, *Trans. Roy. Soc. Canada*, 9, sec. 4, 1892, p. 81, pl. 8, figs. 3, 3a.

**Jovellania semiplanata**—Continued.

*Tripteroceras semiplanatum* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 214.

*Jovellania semiplanata* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 345 (gen. ref.).

Black River or Richmond: Lower Fort Garry, Manitoba.

**KIONELASMA** Simpson. See *Lindströmia* Nicholson and Thompson.

**KIONOCERAS** Hyatt.

Genotype: *Orthoceras doricum* Barrande.

*Kionoceras* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 275.—Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 469.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 519; 2d ed., 1913, p. 600.—Clarke and Ruedemann, Mem. New York State Mus., 5, p. 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 61.

**KIONOCERAS ANGULATUM** Newell. See *Kionoceras cancellatum*.

**Kionoceras bellatulum** (Billings).

*Orthoceras bellatulum* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 58.

Anticostian (Gun River and Jupiter River): Three miles east Challowe River, Anticosti.

**Kionoceras cancellatum** (Hall).

*Orthoceras cancellatum* Hall (not Eichwald), Pal. New York, 2, 1852, p. 292, pl. 63, figs. 1, 4a, b; pl. 65, figs. 4a, b.

*Orthoceras subcancellatum* Hall in Miller, Amer. Pal. Foss., 1st ed., 1877, p. 245; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 323, pl. 33, fig. 5.—Lesley, Geol. Surv. Pennsylvania, Rep. P4, 1889, p. 559, fig.

*Kionoceras cancellatum* Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 55; Geol. Surv. Canada, Pal. Fossils, 3, pt. 4, 1906, p. 264 (discusses synonymy).

*Orthoceras columnare* Hall (not Marklin, 1857), Rep. Progr. Geol. Surv. Wisconsin, 1867, p. 4; 20th Rep. New York State Cab. Hist., 1868, p. 351, pl. 19, (10), figs. 4-8 (extras Jan., 1865); rev. ed. 1868 (1870), p. 411, pl. 19, figs. 4-6, 8.

*Kionoceras columnare* Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 469.

*Orthoceras orus* Hall in Miller, Amer. Pal. Foss., 1st ed., 1877, p. 245.

*Orthoceras* (*Kionoceras*) *orus* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 469, pl. 21, fig. 1; pl. 25, fig. 2.

*Kionoceras orus* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 62, fig. 1266.

*Orthoceras Hoyi* McChesney, Desc. New Fossils, 1861, p. 92.

*Orthoceras lineolatum* McChesney, Desc. New Fossils, 1861, p. 93.

*Orthoceras irregulare* McChesney, Desc. New Fossils, 1861, p. 94.

*Orthoceras woodworthi* McChesney, Plates Illust. New sp. Fossils, 1865, pl. 7, fig. 7; Trans. Chicago Acad. Sci., 1, 1868, p. 53, pl. 7, fig. 7.

*Orthoceras cadmus* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 83.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 38.

*Orthoceras virgatum*? Hall (not Sowerby), Pal. New York, 2, 1852, p. 298, pl. 63, figs. 2a, b, 3.

*Orthoceras scammoni* McChesney, Desc. New Fossils, 1861, p. 92.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 101.—Hall, 20th Rep. New York State Cab. Hist., 1868, p. 381; rev. ed. 1868 (1870), p. 412, footnote.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 99.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 77.



**Kionoceras cancellatum**—Continued.

*Orthoceras angulatum* Hall (not Wahlenberg, 1821), 20th Rep. New York State Cab. Hist., 1868, p. 353, pl. 19 (10), figs. 10, 11; rev. ed. 1868 (1870), p. 413, pl. 19, figs. 9-11; pl. 24, fig. 1.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 504, pl. 24, figs. 8, 8a.

*Orthoceras* (*Kionoceras*) *angulatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 472, pl. 21, fig. 3.

*Kionoceras angulatum* Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 470.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 61, fig. 1265.

Clinton-Guelph: Rochester and Lockport, New York; Ontario; Ohio; Indiana; Illinois; Wisconsin; etc.

Observation.—The name *cancellatum* and the above synonymy is held until a careful study of these cephalopods is made.

*Plesiotype*.—Cat. No. 52951, U.S.N.M. (Kindle and Breger).

**KIONOCERAS COLUMNARE** Newell. See *Kionoceras cancellatum*.

**Kionoceras crawfordi** (Foerste).

*Orthoceras* (*Kionoceras*) *crawfordi* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 284, pl. 5, fig. 26; Geol. Surv. Ohio, Pal., 7, 1893, p. 546, pl. 30, fig. 26.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

**Kionoceras darwini** (Billings).

*Orthoceras darwini* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 161 (adv. sheets, 1861).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 38, pl. 6, figs. 2, 2a; *ibid.*, pt. 2, 1895, p. 100.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 76, fig. 8.

*Orthoceras* (*Kionoceras*) *darwini* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 811 (gen. ref.).

*Kionoceras darwini* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 84, pl. 10, fig. 22; pl. 11, fig. 6; pl. 12, figs. 1-8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 62, fig. 1267.

*Cyrtoceras myrice* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 149, pl. 8, fig. 9.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 39, pl. 6, figs. 3, 3a.

Niagaran (Guelph): New Hope, Durham, etc., Ontario; Shelby and Rochester, New York; Yellow Springs, Ohio; Offley Island, Kennedy Channel, Arctic America.

**Kionoceras delphiense** (Kindle and Breger).

*Orthoceras* (*Kionoceras*) *delphiensis* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 470, pl. 20, figs. 1, 2.

Niagaran: Delphi, Indiana.

**Kionoceras kentlandense** (Kindle and Breger).

*Orthoceras* (*Kionoceras*) *kentlandensis* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 470, pl. 21, fig. 2.

Niagaran: Kentland, Indiana.

**Kionoceras laqueatum** (Hall).

*Orthoceras laqueatum* Hall, Pal. New York, 1, 1847, p. 13, pl. 3, fig. 12; pl. 56, figs. 2a-c; *ibid.*, var. a, p. 206, pl. 56, fig. 3.—Emmons Amer. Geology, 1, pt. 2, 1855, p. 149.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dept., 1879, p. 579.—Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 16.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 552, figs.

**Klonoceras laqueatum**—Continued.

Orthoceras (Kionoceras) laqueatum Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 627 (gen. ref.).

Canadian (Beekmantown): New York.

**Klonoceras magnisulcatum** (Billings).

Orthoceras magni-sulcatum Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1857, p. 330; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 23 (loc. ref.).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 212.

Richmond: Charleton Point, Anticosti (Charleton); Lake Winnipeg, Canada.

KIONOCERAS MEDULLARE Clarke and Ruedemann. See Protokionoceras medullare.

KIONOCERAS ORUS Grabau and Shimer. See Kionoceras cancellatum.

**Klonoceras strix** (Hall and Whitfield).

Orthoceras strix Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 149, pl. 9, fig. 3.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 76.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 558, fig.

Kionoceras strix Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 469.

Niagaran (Guelph): Yellow Springs, Ohio; Wabash, Indiana.

KLITAMBONITES Pander. See Clitambonites Pander.

**KLOEDENELLA** Ulrich and Bassler. Genotype: Kloedenia pennsylvanica Jones.

Kloedenella Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 317.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 358.—Bonnema, Kon. Akad. Wetensch. Amsterdam, 1914, p. 4.

**Kloedenella clarkei** (Jones).

Beyrichia clarkei Jones, Jour. Geol. Soc. London, 46, 1890, p. 17, fig. 2.

Bollia clarkei Ulrich, Geol. Minnesota, 3, 1894, pt. 2, p. 669.

Kloedenella clarkei Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319; Maryland Geol. Surv., Low. Dev., 1913, p. 533, pl. 97, fig. 21.

Helderbergian: Herkimer County, New York (Manlius transition); Cumberland, Maryland (Keyser).

**Kloedenella clarkei paupera** Ulrich and Bassler.

Kloedenella clarkei paupera Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 43, fig. 5; Maryland Geol. Surv., Low. Dev., 1913, p. 534, pl. 98, figs. 1–3.

Helderbergian (Keyser): Cumberland, Maryland.

*Holotype*.—Cat. No. 53280, U.S.N.M.

**Kloedenella halli** (Jones).

Beyrichia halli Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 15, pl. 4, fig. 21.

Bollia halli Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669 (gen. ref.).

Kloedenella halli Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319, fig. 62, pl. 43, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 359, fig. 1663q.

Helderbergian (Manlius transition): Herkimer County, etc., New York.

**Kloedenella pennsylvanica** (Jones).

Kloedenia pennsylvanica Jones, Amer. Geol., 4, 1889, p. 341, pl., figs. 5a–d, 6 (not 7a, b, 8, 9).

Kloedenella pennsylvanica Ulrich and Bassler, Proc. U. S. Nat. Mus., 1908, 35, p. 304, fig. 54; p. 318, pl. 43, figs. 1–3; Maryland Geol. Surv., Low. Dev., 1913, p. 533, pl. 97, figs. 18–21.

Helderbergian: Perry County, Pennsylvania; Tonoloway, etc., Maryland (Keyser).



**Kloedenella symmetrica** (Hall).

*Beyrichia symmetrica* Hall, Pal. New York, 2, 1852, p. 317, pl. 67, fig. 16.

*Bollia symmetrica* Jones, Amer. Geol., 4, 1889, p. 339 (gen. ref.); Quart. Jour. Geol. Soc. London, 46, 1890, p. 12.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 657.—Grabau, Bull. New York State Mus., 45, 1901, p. 219, fig. 151; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 219, fig. 151.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319, fig. 61.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352, fig. 1661.

*Bollia lata* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 12.

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario; Pennsylvania; Maryland.

**Kloedenella trisulcata** (Hall).

*Beyrichia trisulcata* Hall, Pal. New York, 3, 1859, p. 381.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 14, pl. 1, fig. 2.

*Kloedenella trisulcata* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 318. Helderbergian (Manlius transition): Herkimer County, New York.

**Kloedenella turgida** Ulrich and Bassler.

*Kloedenia pennsylvanica* Jones (part), Amer. Geol., 4, 1889, p. 341, figs. 8, 9 (not figs. 5-7).

*Kloedenella turgida* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 318, pl. 43, figs. 6, 7; Maryland Geol. Surv., Low. Dev., 1913, p. 535, pl. 98, figs. 4-6.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 14251.

Helderbergian (Keyser): Perry County, Pennsylvania; Cumberland, Maryland; Keyser, West Virginia.

*Cotypes*.—Cat. No. 53278, U.S.N.M.

**Kloedenella turgida ventrosa** Ulrich and Bassler.

*Kloedenia pennsylvanica* Jones (part), Amer. Geol., 4, 1889, p. 341, figs. 7a, 7b (not figs. 5, 6, 8, 9).

*Kloedenella turgida ventrosa* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 43, fig. 8; Maryland Geol. Surv., Low. Dev., 1913, p. 535, pl. 98, fig. 7.

Helderbergian (Keyser): Perry County, Pennsylvania; Cumberland, Maryland. *Holotypes*.—Cat. No. 53279, U.S.N.M.

**KLOEDENIA** Jones and Holl.

Genotype: *Beyrichia wilckensiana* Jones.

*Kloedenia* Jones and Holl, Ann. Mag. Nat. Hist., 5th ser., 17, 1886, p. 362.—Krause, Zeits. d. d. geol. Gesell., 41, 1889, p. 21.—Koken, Die Leitfossilien, Leipzig, 1896, p. 39, fig. 26A.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 708.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 1908, p. 300.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355.

**Kloedenia barretti** (Weller).

*Beyrichia barretti* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 254, pl. 23, fig. 9.

*Kloedenia barretti* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301 (gen. ref.); Maryland Geol. Surv., Low. Dev., 1913, p. 532, pl. 97, fig. 17.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Tonoloway, Maryland (Keyser).

**Kloedenia centricornis** Ulrich and Bassler.

*Kloedenia centricornis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 1908, 35, pl. 38, fig. 23; Maryland Geol. Surv., Low. Dev., 1913, p. 529, pl. 97, figs. 1-4.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 14251.

Helderbergian (Keyser): Cumberland, Maryland.

*Holotype*.—Cat. No. 53305, U.S.N.M.

***Klœdenia fimbriata* Ulrich and Bassler.**

*Klœdenia fimbriata* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 38, fig. 22; Maryland Geol. Surv., Low. Dev., 1913, p. 529, pl. 97, figs. 5-7.

Helderbergian: Herkimer County, New York; Cumberland, Maryland (Keyser).

*Holotype*.—Cat. No. 53306, U.S.N.M.

***Klœdenia initialis* (Ulrich).**

*Beyrichia initialis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 658, pl. 43, figs. 82, 83.

*Klœdenia initialis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, pl.

38, figs. 12, 13.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig. 1663, e, f.

Black River (Decorah): Minneapolis, Minnesota.

*Holotype*.—Cat. No. 41666, U.S.N.M.

***Klœdenia jerseyensis* (Weller).**

*Beyrichia jerseyensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 255, pl. 23, fig. 5.

*Klœdenia jerseyensis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

***Klœdenia kokomoensis* Foerste.**

*Klœdenia kokomoensis* Foerste, Cincinnati Soc. Nat. Hist., Jour., 21, 1909, p. 32, pl. 1, figs. 3a-b.

Cayugan (Kokomo): Kokomo, Indiana.

***Klœdenia kümmeli* (Weller).**

*Beyrichia kümmeli* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 266, pl. 24, fig. 21.

*Klœdenia kümmeli* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301

(gen. ref.); Maryland Geol. Surv., Low. Dev., 1913, p. 531, pl. 97, fig. 16.

Helderbergian: Two miles south of Tristates, New York ("Manlius"); Tonoloway, Maryland (Keyser).

***Klœdenia manliensis* (Weller).**

*Beyrichia manliensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 268, pl. 23, fig. 10.

*Klœdenia manliensis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, pl. 38, fig. 21.

*Klœdenia manliusensis* Clarke, Mem. New York State Mus., No. 9, pt. 2, 1909, p. 20.

Helderbergian: Two miles South of Tristates, New York (Keyser—"Manlius"); Dalhousie, New Brunswick (Dalhousie).

*Pleiotypes*.—Cat. No. 53941, U.S.N.M.

***Klœdenia manliensis deckerensis* (Weller).**

*Beyrichia deckerensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 256, pl. 23, fig. 11.

*Klœdenia manliensis deckerensis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

*KLœDENIA MANLIUSENSIS* Clarke. See *Klœdenia manliensis*.

***Klœdenia monroensis* Grabau.**

*Klœdenia monroensis* Grabau, Michigan Geol. Surv., Geol., 1st ser., 1909, p. 206, pl. 15, fig. 11.

Lower Monroan (Raisin River): Newport, Michigan.



**Klœdenia montaguensis** (Weller).

*Beyrichia montaguensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 267, pl. 24, fig. 23.

*Klœdenia montaguensis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301. Helderbergian ("Manlius"): Two miles south of Tristates, New York.

**Klœdenia nearpassi** (Weller).

*Beyrichia nearpassi* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 255, pl. 23, figs. 7, 8.

*Klœdenia nearpassi* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, p. 304, fig. 55, 56 (gen. ref.); Maryland Geol. Surv., Low. Dev., 1913, p. 530, pl. 97, figs. 12, 13.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Tonoloway, Maryland (Keyser).

**Klœdenia notata** (Hall).

*Beyrichia notata* Hall, Pal. New York, 3, 1859, p. 379.

*Klœdenia notata* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 13, pl. 4, figs. 22, 23.

Helderbergian (Manlius transition): Herkimer County and near Utica, New York.

**KLœDENIA PENNSYLVANICA** Jones. See *Klœdenella pennsylvanica*, *K. turgida*, and *K. turgida ventrosa*.

**Klœdenia prænuntia** Ulrich and Bassler.

*Klœdenia prænuntia* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, pl. 38, fig. 15.

Trenton (Hermitage): Four miles south of Carthage, Tennessee.

*Holotype*.—Cat. No. 41643, U.S.N.M.

**Klœdenia smocki** (Weller).

*Beyrichia smocki* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 268, pl. 24, fig. 24.

*Klœdenia smocki* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 302.

Helderbergian ("Manlius"): Two miles south of Tristates, New York.

**Klœdenia sussexensis** (Weller).

*Beyrichia sussexensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 253, pl. 23, figs. 3-4.

*Klœdenia sussexensis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 302, pl. 38, figs. 19, 20; Maryland Geol. Surv., Low. Dev., 1913, p. 532, pl. 97, figs. 14, 15.

*Beyrichia perinflata* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 254, pl. 23, fig. 6.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Tonoloway, Maryland (Keyser); Dalhousie, New Brunswick (Dalhousie).

*Plesiotypes*.—Cat. No. 53940, U.S.N.M.

**Klœdenia wallpackensis** (Weller).

*Beyrichia wallpackensis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 266, pl. 24, fig. 22.

*Klœdenia wallpackensis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 302.

Helderbergian ("Manlius"): Two miles south of Tristates, New York.

**KOKENIA** Ulrich and Scofield. See *Kokenospira* Bassler.

**KOKENOSPIRA** Bassler (new name). Genotype: *Bucanella esthona* Koken.  
*Bucanella* Koken (part), Neues Jahrb. Min., Geol., Beilageband, 6, 1889, p. 389  
(not Meek, 1870).

*Kokenia* Ulrich and Scofield (not Holzapfel, 1895), Geol. Minnesota, 3, pt. 2,  
1897, pp. 849-882.

**Kokenospora costalis** (Ulrich and Scofield).

*Kokenia costalis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 882, pl.  
64, figs. 46-49.—Schuchert, Proc. U. S. Nat. Mus., 1900, p. 164.

Trenton: Near Cannon Falls, Minnesota (Prosser); Frobisher Bay, Baffin Land.

*Holotype*.—Cat. No. 45868, U.S.N.M.

**KRAUSELLA** Ulrich.

Genotype: *K. inæqualis* Ulrich.

*Krausella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 691.—Miller, N. A. Geol. Pal.,  
2d App., 1897, p. 788.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p.  
362.

**Krausella anticostiensis** (Jones).

*Bairdia anticostiensis* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 548,  
pl. 21, figs. 3a, b.

*Krausella anticostiensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 691.

Richmond (English Head, Charleton): English Head, etc., Anticosti.

**Krausella arcuata** Ulrich.

*Krausella arcuata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 692, pl. 44, figs.  
47-53.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 362, figs. 1667a-c.

Black River: Minneapolis, Minnesota; Mineral Point, Wisconsin; Dixon, Illinois  
(Platteville); High Bridge, Kentucky (Lowville).

*Cotypes*.—Cat. Nos. 41717-41719, U.S.N.M.

**Krausella inæqualis** Ulrich.

*Krausella inæqualis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 692, pl. 44, figs.  
44, 46.

Black River (Platteville): Dixon, Illinois.

*Holotype*.—Cat. No. 41727, U.S.N.M.

**KUTORGINA** Hall and Clarke: See *Billingsella* Hall and Clarke.

**LABECHIA** Edwards and Haime.

Genotype: *Monticularia conferta* Lonsdale.

*Labechia* Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch. Mus.  
Hist. Nat., 5), pp. 155, 279.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 444.—  
Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 284.—Salter, Cat. Camb. Sil.  
Foss., 1873, p. 109.—Lindstrom, Ann. Mag. Nat. Hist., 4th ser., 18, 1876,  
p. 4.—Steinmann, Palæontographica, 25, 1878, p. 112.—Nicholson and  
Murie, Jour. Linnean Soc. London, Zool., 14, 1878, p. 234.—Nicholson, Tab.  
Corals Pal. Period, 1879, p. 350.—Zittel, Handb. Pal., 1, 1879, p. 287.—  
Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 541.—Nicholson, Mon. British  
Strom., Pal. Soc., 1886, pp. 13, 19, 60.—Waagen, Neues Jahrb. f. Min., Geol.  
Pal., 1, 1889, p. 259.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p.  
46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 699.—  
Parks, Univ. Toronto Studies, Geol. Ser., 5, 1908, p. 31; *ibid.*, No. 7, 1910, p. 25.

**LABECHIA CANADENSE** Nicholson. See *Stromatocerium canadense*.

**LABECHIA CORRUGATA** Foerste. See *Dermatostroma corrugatum*.

**LABECHIA CORRUGATA-GLYPTA** Foerste. See *Dermatostroma glyptum*.



**Labechia delicatula** Parks.

*Labechia delicatula* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 32, pl. 9, figs. 4-6  
 Clinton (Osgood): Osgood, Indiana.  
*Cotypes*.—Cat. No. 41218, U.S.N.M.

**Labechia durhamensis** Parks.

*Labechia durhamensis* Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 20, pl. 2, figs. 4-6; pl. 3, fig. 1; pl. 6, figs. 1, 2.  
 Niagaran (Guelph): Durham, Guelph, etc., Ontario.

**LABECHIA HURONENSIS** Whiteaves. See *Stromatocerium huronense*.

**Labechia macrostyla** Parks.

*Labechia macrostyla* Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 25, pl. 22, fig. 12; pl. 23, figs. 1, 2, 11.  
 "Lower Trenton drift": Ann Arbor, Michigan.  
*Holotype*.—Cat. No. 36929, U.S.N.M.

**Labechia minora** Parks.

*Labechia minora* Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 22, pl. 3, figs. 2, 5, 6.  
 Niagaran (Guelph): Elora, Durham, etc., Ontario.

**LABECHIA MONTIFERA** Ulrich. See *Stromatocerium montiferum*.

**LABECHIA OHIOENSIS** Nicholson. See *Stromatocerium huronense*.

**LABECHIA PAPILLATA** of authors. See *Dermatostroma papillatum*.

**LABECHIA SCABRA** Harper and Bassler. See *Dermatostroma scabrum*.

**Labechia subcylindrica** (James).

*Stromatopora subcylindrica* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 20, fig. 1.—J. F. James, *ibid.*, 9, 1887, pp. 39, 103, 251; *ibid.*, 15, 1892, p. 90.—Miller, N. A. Geol. Pal., 1889, p. 166.  
*Labechia subcylindrica* Parks, Univ. Toronto Studies, Geol. Series, No. 7, 1910, p. 27, pl. 23, figs. 3, 4, 6, 7.  
 Richmond (Waynesville): Near Morrow, Ohio.

**LABYRINTHITES** Lambe.

Genotype: *L. chidlensis* Lambe.

*Labyrinthites* Lambe, Cruise of the "Neptune," App. 4, 1906, p. 327.

**Labyrinthites chidlensis** Lambe.

*Labyrinthites chidlensis* Lambe, Cruise of the "Neptune," App. 4, 1906, p. 328.  
 Ordovician?: Cape Chidley, Hudson Strait, Arctic America.

**LACCOPHYLLUM** Simpson.

Genotype: *L. acuminatum* Simpson.

*Laccophyllum* Simpson, Bull. New York State Mus., 39, 1900, p. 201.

**Laccophyllum acuminatum** Simpson.

*Laccophyllum acuminatum* Simpson, Bull. New York State Mus., 39, 1900, p. 202, figs. 7-9.  
 Niagaran (Brownsport): Perry County, Tennessee.

**LAGENOGRAPTUS** Hall. See *Monograptus* Geinitz.

**LAMELLOPORA** Owen. See *Strombodes* Schweigger.

**LAMPTEROCRINUS** Roemer.Genotype: *L. tennesseensis* Roemer.

*Balanocrinites* Troost (not Agassiz, 1845), Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 50 (not defined); Amer. Jour. Sci. and Arts, (2) 8, 1847, p. 419.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 31.

*Balanocrinus* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 131.

*Lampterocrinus* Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 40.—Hall, Trans. Albany Inst., 4, 1863, p. 202.—Hall, 20th Rep. New York State Cab. Nat. Hist. (extras 1865), 1868, p. 328; *ibid.*, rev. ed., 1870, footnote, p. 372.—Zittel, Handb. d. Pal., 1, 1879, p. 375.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, pp. 358, 373 (Rev. Pal., pt. 2, pp. 184, 199); *ibid.*, 1885, p. 323.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 260.—De Loriol, Pal. Francaise, 11, 1882, p. 59.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 207.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 199, fig. 124.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 145.—Weller, Bull. Chicago Acad. Sci., 4, pt. 1, 1900, p. 80, fig. 39.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 102.—Zittel, Grundzuge Pal., 2, 1910, p. 161.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 548.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 187.

***Lampterocrinus? comptus* Rowley.**

*Lampterocrinus? comptus* Rowley, Amer. Geol., 34, 1904, p. 279, pl. 16, figs. 57, 58. Upper Medinan (Edgewood): Three miles west of Louisiana, Missouri.

***Lampterocrinus? dubius* Weller.**

*Lampterocrinus? dubius* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 84, pl. 2, figs. 6, 7.

Niagaran (Racine): Lemont and Joliet, Illinois.

***Lampterocrinus inflatus* (Hall).**

*Balanocrinus inflatus* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 22.

*Lampterocrinus inflatus* Hall, Prelim. Notice, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 24, pl. 1, fig. 6; 20th Rep. New York State Cab. Nat. Hist., 1868 (extras 1865), p. 328, pl. 10 (1), fig. 6; rev. ed., p. 374, pl. 10, fig. 6.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 81, figs. 2-3.

Niagaran (Racine): Racine, Wisconsin; Bridgeport and Romeo, Illinois.

***Lampterocrinus parvus* Hall.**

*Lampterocrinus parvus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 272, pl. 15, fig. 6; Trans. Albany Inst., 10, 1883, p. 65.

Niagaran (Waldron): Waldron, Indiana.

***Lampterocrinus robustus* Weller.**

*Lampterocrinus robustus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 83, pl. 2, figs. 4, 5.

Niagaran (Racine): Romeo, Lemont, and Joliet, Illinois.

***Lampterocrinus? subglobosus* Weller.**

*Lampterocrinus? subglobosus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 83, pl. 3, fig. 5.

Niagaran (Racine): Bridgeport and Hawthorne, Illinois.



**Lampterocrinus tennesseensis** Roemer.

*Lampterocrinus tennesseensis* Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 37, pl. 4, figs. 1a, 1b; Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 13.—Miller, N. A. Geol. Pal., 1889, p. 257, fig. 347.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 208, pl. 13, figs. 10a-d.—Bather, Treatise on Zoology, pt. 3, Echinoderma, 1900, p. 199, fig. 124.—Foerste, Jour. Geol., 11, 1903, p. 712 (loc. occ.).—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 103, pl. 7, figs. 8-10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 548, fig. 1877.

*Balanocrinites sculptus* Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1850, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Niagaran (Brownspert): Decatur and Wayne Counties, Tennessee.

*Plesiotypes*.—Cat. No. 39920, U.S.N.M. (Troost's type of *B. sculptus*).

**LAPWORTHURA CYLINDRICA** Parks. See *Tæniaster cylindricus*.

**LASIOCRINUS** Kirk.

Genotype: *Homocrinus scoparius* Hall.

*Homocrinus* Hall (part), Pal. New York, 2, 1852, p. 185; *ibid.*, 3, 1859, p. 102.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, Rev. Pal., pt. 1, 1879; *ibid.*, 1886, p. 77; pt. 3, p. 220.—Bather, Crin. Gotland, 1893, p. 101.  
*Lasiocrinus* Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 482.

**Lasiocrinus scoparius** (Hall).

*Homocrinus scoparius* Hall, Pal. New York, 3, 1859, p. 102, pl. 1, figs. 1-9.—Bather, Kongl. Svenska Vet. Akad. Handl., 25, 1893, p. 105.—Talbot, Amer. Jour. Sci., 20, 1905, p. 19, pl. 3, fig. 3.

*Dendrocrinus* (*Homocrinus*) *scoparius* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 302 (Rev. Pal., 1, p. 79).

*Lasiocrinus scoparius* Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 482.

Helderbergian (Manlius transition beds or Coeymans): Schoharie and Wheelocks Hill, Litchfield, Herkimer County, New York.

**LASIOGRAPTUS** Lapworth.

Genotype: *L. costatus* Lapworth.

*Lasiograptus* Lapworth, Geol. Mag., 10, 1873, p. 559.—Zittel, Handb. Pal., 1, 1879, p. 302.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Roemer and Frech, Leth. geog., 1, Theil, Leth. Pal., 1, 3, Lief, 1897, p. 671.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 472-479.

**Laslograptus bimucronatus** (Nicholson).

*Graptolithus* sp. Hall, Pal. New York, 3, 1859, p. 507, figs. 1-3.

*Diplograptus bimucronatus* Nicholson, Ann. Mag. Nat. Hist., 4, 1869, p. 236, pl. 11, fig. 12.—Clarke, Geol. Mag., 4th ser., 9, 1902, p. 499.

*Halograptus bimucronatus* Lapworth, Cat. West. Scott. Foss., 1876, p. 7, pl. 2, fig. 58.

*Halograptus* (*Lasiograptus*) *bimucronatus* Roemer and Frech, Leth. Pal., 1, 1897, p. 672, fig. 224.

*Diplograptus* (*Halograptus*) *bimucronatus* Lapworth, Belfast Field Club, Ann. Rep. and Proc., 2d ser., app., pt. 4, 1877, p. 134, pl. 6, fig. 23.

*Lasiograptus bimucronatus* Tullberg, Sver. Geol. Und. Ser. C, No. 50, 1382, p. 20.

*Lasiograptus mucronatus* Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, p. 178.—Gurley, Jour. Geol., 4, 1896, p. 299.—Roemer and Frech, Leth. Pal., 1, 1897, p. 672, fig. 224.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 481-483, pl. 29, figs. 12-18; pl. 30, figs. 6-8; pl. 31, figs. 4-5; text figs. 458-463.

**Laslograptus bimucronatus**—Continued.

*Graptolithus whitfieldi* (part) Hall, Geol. Surv. Canada, Canadian Org. Rem., dec. 2, 1865, pl. B, figs. 6–11.

Ordovician: Scotland (Glenkiln); Wales; Ireland; Scania; Kenwood, Stockport, etc., New York (Normanskill); Arkansas.

**Laslograptus bimucronatus timidus** Ruedemann.

*Lasiograptus bimucronatus* mut. *timidus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 483–484, pl. 29, figs. 19, 20; text figs. 464, 465.

Utica: Flat Creek, near Mohawk, and Holland Patent, New York; Cincinnati, Ohio.

**Laslograptus (Thysanograptus) eucharis** (Hall).

*Retiograptus eucharis* Hall, Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 146, pl. 14, fig. 9; New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, pp. 206, 224, pl. 4, fig. 9.—Walcott, Trans. Alb. Inst., 10, 1881 (adv. sheets, 1879, p. 35).—Ami, Can. Geol. Surv. Ann. Rep., pt. 11, 1889, pp. 23K, 117K; Can. Rec. Sci., 5, 1893, pp. 180, 236.—Roemer and Frech, Leth. geog., 1 Theil., Leth. Pennsylvania, 1, 3 Lief., 1897, p. 608, fig. 173.

*Retiograptus eucharis* Nicholson, Mon. British Grapt., 1872, p. 124, fig. 63.

*Glossograptus? eucharis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 397–400, pl. 26, figs. 18, 19; pl. 27, figs. 11–13, text figs. 346–352.

*Diplograptus pristiniiformis* Ruedemann, Amer. Jour. Sci., 3d ser., 18, 1895, pp. 453, 455, figs. 2, 3.—Wiman, Bull. Geol. Inst. Upsala, 2, pt. 2, 1895, pp. 69, 71, figs. 2, 3.

*Diplograptus ruedemanni* Gurley, Jour. Geol., 4, 1896, pp. 298, 307.—Ruedemann, 14th Rep. State Geol. New York for 1894, 1897, p. 219, pl. 1, figs. 2–4, 6–7, 10; pl. 2, figs. 1–4; pl. 5, fig. 1.—Tornquist, Zoolog. Centralbl., 4, 1897, p. 5.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 523 ff.

*Diplograptus* cf. *aculeatus* Frech, Roemer and Frech, Leth. Pal., 1, 1897, p. 632, pl. A, fig. 2.

*Lasiograptus (Thysanograptus) eucharis* Ruedemann, Bull. New York State Mus., 162, 1912, p. 84, figs. 24–28.

Trenton: Lake St. John, etc., Quebec (Collingwood); Vermont; Mohawk and Hudson Valleys, New York (Snake Hill, Canajoharie, and Schenectady).

**Lasiograptus mucronatus** (Hall).

*Graptolithus mucronatus* Hall, Pal. New York, 1, 1847, p. 268, pl. 73, figs. 1a–d.

*Diplograptus mucronatus* Geinitz, Die Graptolithen, 1852, p. 23.—Carruthers, Mem. Geol. Surv., 3, 1866, 330, pl. 11A, fig. 6; pl. 12, fig. 1; *ibid.* 5, 1868, p. 131, pl. 5, fig. 2.—Nicholson, Geol. Mag., 4, 113, pl. 7, figs. 5, 5a; Quart. Jour. Geol. Soc. London, 24, 1868, p. 139.—McCoy, Pal. Victoria, Prodr., dec. 1, 1874, p. 10, pl. 1, fig. 5.—Walcott, Trans. Alb. Inst., 10, 1883 (adv. sheets, 1879, p. 34).—Ami, Can. Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 117K.—Walcott, Bull. Geol. Soc. Am., 1, 1890, p. 339.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.

*Diplograptus (Lasiograptus) mucronatus* Lapworth, Belfast Nat. Field Club Ann. Rep., 1, 1877, p. 134, pl. 6.

*Lasiograptus mucronatus* Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, 178f.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, 1892, p. 413.—Ruedemann Bull. New York State Mus., 42, 1901, p. 544.—Weller, Geol. Surv. New Jersey, Pal., 3, 1902, p. 212, pl. 16, figs. 16, 17.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 479–481, pl. 29, figs. 9–11; pl. 30, figs. 1–5; pl. 31, figs. 1–3; figs. 456, 457.

Chazyan (Normanskill): Mt. Moreno, Kenwood, Glenmont, etc., New York; Arkansas; Quebec. Glenkiln shale of Great Britain.



**LASIOGRAPTUS MUCRONATUS** Lapworth. See *Lasiograptus bimucronatus*.

**LASIOTHRIX** Dawson and Hinde. Genotype: *L. curvicostata* Dawson and Hinde.

*Lasiotrix* Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 50.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 114.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 667.

**Lasiotrix curvicostata** Dawson and Hinde.

*Lasiotrix curvicostata* Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 51, fig. 21.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 144, fig. 24.  
Canadian? (Levis?): Metis, Quebec.

**Lasiotrix flabellata** Dawson and Hinde.

*Lasiotrix flabellata* Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 51, fig. 22.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 115, fig. 25.  
Canadian? (Levis?): Metis, Quebec.

**LECANOCRINUS** Hall.

Genotype: *L. macropetalus* Hall.

*Lecanocrinus* Hall, Pal. New York, 2, 1852, p. 199.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 319.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 278.—Schultze, Denk. d. Kais. Akad. Wiss., Math.-Naturw., Cl. 26, Abth. 2, 1867, p. 152, fig. 7.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 262 (Rev. Pal., pt. 1, p. 39); *ibid.*, 1890, p. 388.—Beyrich, Ann. Mag. Nat. Hist., 4th ser., 7, 1871, p. 404.—Angelin, Icon. Crinoid., 1878, p. 11.—Zittel, Handb. Pal., 1, 1879, p. 355.—Miller, N. A. Geol. Pal., 1889, p. 257.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 147, fig. 54.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 163.—Grabau, Bull. New York State Mus., 45, 1901, p. 160; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 160.—Springer, Amer. Geol., 30, 1902, p. 94; Jour. Geol., 14, 1906, p. 517.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 564.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 203.

*Cyrtidocrinus* Angelin Icon. Crin. Suec., 1878, p. 20.

**LECANOCRINUS CALICULUS** Hall. See *Pycnosaccus calyculus*.

**LECANOCRINUS ELEGANS** Billings. See *Protaxocrinus elegans*.

**LECANOCRINUS EXCAVATUS** Ringueberg. See *Asaphocrinus ornatus*.

**LECANOCRINUS GREENEI** Miller and Gurley. See *Anisocrinus greenei*.

**Lecanocrinus hemisphericus** Rowley.

*Lecanocrinus hemisphericus* Rowley, Amer. Geol., 34, 1904, p. 271, pl. 14, fig. 17-19.

Niagaran (Bainbridge): Near St. Mary's, Ste. Genevieve County, Missouri.

Observation.—Probably the same as *L. pisiformis* (Roemer).

**LECANOCRINUS INCISUS** Ringueberg. See *Asaphocrinus incisus*.

**LECANOCRINUS LEVIS** Billings. See *Protaxocrinus lævis*.

**Lecanocrinus macropetalus** Hall.

*Lecanocrinus macropetalus* Hall, Pal. New York, 2, 1852, p. 199, pl. 45, figs. 1a-h.—Emmons, Man. Geology, 1860, p. 63, fig. 42.—Miller, N. A. Geol. Pal., 1889, p. 257, fig. 348.—Grabau, Bull. New York State Mus., 45, 1901, p. 160, fig. 55; Bull. Buffalo Soc. Nat. Sci., 7, p. 160, fig. 55.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 564, fig. 1901, 1902.

**Lecanocrinus macropetalus**—Continued.

Cyathocrinus? Hall, Geol. 4th Dist. New York, Tab. Org. Rem., No. 21, 1843, figs. 5a-b.

Clinton (Rochester): Lockport, New York.

**Lecanocrinus meniscus** Springer.

Lecanocrinus meniscus Springer, Mono. Crin. Flex., Smith. Inst. (in press).

Niagaran (Brownsport): Decatur County, Tennessee.

**LECANOCRINUS NITIDUS** Ringueberg. See *Asaphocrinus ornatus*.

**LECANOCRINUS ORNATUS** Hall. See *Asaphocrinus ornatus*.

**LECANOCRINUS OSWEGOENSIS** Miller and Gurley. See *Anisocrinus oswegoensis*.

**Lecanocrinus pisiformis** (Roemer).

Poteriocrinus pisiformis Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 54, pl. 4, figs. 7a-d.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 392.

Arachnocrinus pisiformis Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 177 (gen. ref.).—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, Rev. Pal., pt. 1, 1879, p. 94.—Miller, N. A. Geol. Pal., 1889, p. 224, fig. 248.

Cyathocrinus pisiformis Whitfield, Geol. Wisconsin, 4, 1882, p. 353 (gen. ref.).

Lecanocrinus pisiformis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 268 (Rev. Pal., pt. 2, 227).

Niagaran: Decatur County, Tennessee (Brownsport); ?Wisconsin (Racine).

Observation.—See also *L. hemisphericus* Rowley.

**Lecanocrinus pusillus** (Hall).

Cyathocrinus pusillus Hall, Trans. Albany Inst., 4, 1863, p. 200; Prelim. Notice, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 20; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 324, rev. ed., 1870, p. 366; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 15, figs. 1-6.

Lecanocrinus pusillus Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 136, pl. 15, figs. 1-6; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 267, pl. 14, figs. 1-6; pl. 15, fig. 7.—Springer, Mono. Crin. Flex., Smith. Inst. (in press).

Lecanocrinus tennesseensis Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 651, pl. 7, figs. 7, 8 (adv. sheets, 1891, p. 41).

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

**LECANOCRINUS PUSILLUS** Winchell and Marcy. See *Lecanocrinus waukoma*.

**Lecanocrinus puteolus** Ringueberg.

Lecanocrinus puteolus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 11, pl. 1, fig. 8.

Clinton (Rochester): Lockport, New York.

**LECANOCRINUS SIMPLEX** Hall. See *Ichthyocrinus laevis*.

**Lecanocrinus solidus** Ringueberg.

Lecanocrinus solidus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 8, pl. 1, fig. 4.

Clinton (Rochester): Lockport, New York.

**LECANOCRINUS TENNESSEENSIS** Miller. See *Lecanocrinus pusillus*.

**Lecanocrinus waukoma** (Hall).

Cyathocrinus waukoma Hall, Adv. Pub. 18th Rep. New York State Cab. Nat. Hist., 1865, p. 20, pl. (2), figs. 11, 12; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 324, pl. 11 (2), figs. 11, 12; rev. ed., 1870, p. 367, pl. 11, figs. 11, 12.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.



**Lecanocrinus waukoma**—Continued.

*Lecanocrinus waukoma* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 148, pl. 15, figs. 6–11.

*Lecanocrinus pusillus* Winchell and Marcy (not Hall), Mem. Boston Soc. Nat. Hist., 1, 1865, p. 90.

Niagaran (Racine): Racine and Waukesha, Wisconsin; Bridgeport, Romeo, Lemont, etc., Illinois.

**LEDA LEVATA** Emmons. See *Ctenodonta levata*.

**LEDA PLANA** Emmons. See *Lyrodesma planum*.

**LEDA PULCHELLA** Emmons. See *Ctenodonta pulchella*.

**LEIOCLEMA** Rominger. See *Lioclema* Ulrich.

**LEIOCLEMA FLORIDA** Ulrich. See *Nicholsonella florida*.

**LEIOCLEMA? LAMINATUM** Ulrich. See *Fistulipora laminata*.

**LEIOCLEMA SINGULARE** Ulrich. See *Trematopora? singularis*.

**LEIODITIA** Ulrich. See *Elpe Barrande*.

**LEIOPTERIA** Hall.

Genotype: *L. dekayi* Hall.

*Leiopteria* Hall, Pal. New York, 5, pt. 1, Lam. 1883, p. 4; *ibid.*, 1884, p. 13; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 406; Rep. State Geol. New York, 1884, p. 14.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 78.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 246.—Hind, Mon. British Carb. Lam., 2, Pal. Soc., 1901, p. 9.

*Liopteria* Miller, N. A. Geol. Pal., 1889, p. 484.—Clarke, Archivos Mus. Nat. Rio Janeiro, 10, Eng. ed., 1900, p. 48.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 208; Bull. New York State Mus. 45, 1901, p. 208.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 424.

**Leiopteria rubra** Williams.

*Leiopteria rubra* Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 345, pl. 31, fig. 4. Silurian (Pembroke): Giffis Bay, Washington County, Maine.

*Holotype*.—Cat. No. 58971, U.S.N.M.

**Leiopteria subplana** (Hall).

*Avicula subplana* Hall, Pal. New York, 2, 1852, p. 283, pl. 59, figs. 3a–c.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 628.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 70, fig.

*Pterinea subplana* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 52 (gen. ref.).

*Pteronites? subplana* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 243, pl. 22, fig. 1.

*Liopteria(?) subplana* Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 208, fig. 136; Bull. New York State Mus., 45, 1901, p. 208, fig. 136.

*Leiopteria? subplana* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 424, fig. 554.

Silurian: Lockport, etc. (Rochester-Guelph) and Schoharie Valley, New York (Cobleskill).

?Helderbergian (Keyser): Two miles south Tristates, New York.

**LEIOSTEGIUM** Raymond.

Genotype: *Bathyrus quadratus* Billings.

*Leiostegium* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 68.

**Lelostegium breviceps** (Billings).

Bathyrus breviceps Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 262, fig. 246.

Lelostegium breviceps Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 69.  
Chazyan (Quebec—N): Table Head, Newfoundland.

**Lelostegium quadratum** (Billings).

Bathyrus quadratus Billings, Canadian Nat. Geol., 5, 1860, p. 321, fig. 27; Geol. Canada, Geol. Surv. Canada, 1863, p. 238, fig. 272; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 412, fig. 396.

Lelostegium quadratum Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 68, pl. 7, fig. 17.

Canadian (Levis-Limestone): Point Levis, Quebec.

**LEJOPYGE** Hawle and Corda.

Genotype: *Battus lævigatus* Hisinger.

Lejopyge Hawle and Corda Abh. böhm. Gesell. Wiss., 5, 1847, p. 51, pl. 3, fig. 25.

**Lejopyge cyclopyge?** (Tullberg).

Agnostus cyclopyge Tullberg, Sveriges Geol. Undersök., ser. C, No. 42, 1880, p. 26, pl. 2, fig. 15.

Agnostus cf. cyclopyge Matthew, Geol. Surv. Canada, Rep. Camb. Rocks C. Breton, 1903, p. 222.

Canadian (Bretonian—Div. C3b): East Bay, east of Bras d'Or Lake, Cape Breton, Nova Scotia. Lower Ordovician of Europe.

**LEPADOCRINUS** Cumings. See *Lepadocystis* Carpenter.

**LEPADOCRINUS** Hall (part). See *Lepocrinites* Conrad and *Apiocystites* Forbes.

**LEPADOCRINUS MOOREI** Cumings. See *Lepadocystis moorei*.

**LEPADOCYSTIS** Carpenter.

Genotype: *Lepocrinites moorei* Meek.

*Lepadocystis* Carpenter, Linn. Soc. Jour. Zool., 24, 1891, p. 10.—Bather, Treatise on Zoology, pt. 3, Echinoderma, 1900, p. 61.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 458.

*Lepadocrinus* Zittel (part), Handb. Pal., 1, 1879, p. 421.—Miller (part), N. A. Geol. Pal., 1889, p. 257.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 714.

*Meekocystis* Jaekel, Stammesges. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 277. (Genotype: *Lepocrinites moorei* Meek.)

**LEPADOCYSTIS CLINTONENSIS** Parks. See *Brockocystis clintonensis*.

**Lepadocystis moorei** (Meek).

*Lepocrinites moorei* Meek, Amer. Jour. Sci., 3d ser., 2, 1871, p. 296; Geol. Surv. Ohio, Pal., 1, 1873, p. 39, pl. 3, figs. 4a-c.

*Lepadocystis moorei* Carpenter, Linn. Soc. Jour. Zool., 24, 1891, 10.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 61, fig. 28.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 459, pl. 5, fig. 1.

*Meekocystis moorei* Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 278, fig. 58, p. 279.

*Lepadocrinus moorei* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 727, pl. 4, figs. 6-6b.

Richmond (Whitewater): Richmond, Indiana.



**LEPERDITELLA** Ulrich.Genotype: *Leperditia inflata* Ulrich.*Leperditia* (part) Ulrich, Amer. Geol., 10, 1892, p. 263.*Leperditella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636; Zittel-Eastman Textb.Pal., 1, 1900, p. 643.—Bassler, *ibid.*, 2d ed., 1913, p. 737.—Grabau and Shimer.

N. A. Index Fossils, 2, 1910, p. 339.

**Leperditella æquilatera** (Ulrich).*Leperditia æquilatera* Ulrich, Amer. Geol., 10, 1892, p. 265, pl. 9, figs. 9–11.*Leperditella æquilatera* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46c.

Stones River (Ridley): Bottom of gorge at High Bridge, Kentucky.

*Holotype*: Cat. No. 41312, U.S.N.M.**Leperditella canalis** Ulrich.*Leperditella canalis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637, pl. 43, figs. 1–3.*Leperditia canalis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 788.

Black River (Platteville): Minneapolis and near Cannon Falls, Minnesota.

*Holotype*.—Cat. No. 41304, U.S.N.M.**LEPERDITELLA?** *DORSICORNIS* Ulrich. See *Primitia dorsicornis*.**Leperditella germana** (Ulrich).*Leperditia germana* Ulrich, Amer. Geol., 10, 1892, p. 266, pl. 9, figs. 16–18.*Leperditella germana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, pp. 636, 638, pl. 45, figs. 24–26.

Black River (Platteville): Mineral Point, Wisconsin.

*Holotype*.—Cat. No. 41307, U.S.N.M.**Leperditella? glabra** (Ulrich).*Primitia glabra* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 134, pl. 10, figs. 9a–9c.*Leperditella? glabra* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 639.

Richmond (Whitewater): Oxford and Blanchester, Ohio; Richmond, Indiana.

*Holotype*.—Cat. No. 41827, U.S.N.M.**Leperditella inflata** (Ulrich).*Leperditia inflata* Ulrich, Amer. Geol., 10, 1892, p. 265, pl. 9, figs. 12–15.*Leperditella inflata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, figs. 46a–46d.—

Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 339, fig. 1656a–c.

Stones River (Ridley): Bottom of gorge at High Bridge, Kentucky.

*Cotypes*.—Cat. No. 41311, U.S.N.M.**Leperditella? labellosa** (Jones).*Isochilina labellosa* Jones, Cont. Canadian Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 69, pl. 10, figs. 16a–c, 17, 19.*Leperditella? labellosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637.

Stones River (Pamelia): Aylmer, Quebec; Gloucester, Carleton County, Ontario.

**Leperditella macra** Ulrich.*Leperditella macra* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 638, pl. 43, figs. 7–9.*Leperditia macra* Miller, N. A. Geol. Pal., 2d App., 1897, p. 788 (gen. ref.).

Black River (Decorah): Minneapolis, Minnesota.

*Holotype*.—Cat. No. 41306, U.S.N.M.**Leperditella mundula** (Ulrich).*Leperditia mundula* Ulrich, Amer. Geol., 10, 1892, p. 265, pl. 9, figs. 4–8.*Leperditella mundula* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46e–46h.

Stones River (Ridley): Bottom of gorge at High Bridge, Kentucky.

*Cotypes*.—Cat. No. 41309, U.S.N.M.

**Leperditella? obscura** (Jones).

*Leperditia? obscura* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 71, pl. 10, figs. 15a-c.

*Leperditella? obscura* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637.

Trenton: Falls of Lorette, Quebec.

**Leperditella ornata** Weller.

*Leperditella ornata* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 209, pl. 13, figs. 13-15.

Trenton: Near Iliff's Pond, two miles southeast of Newton, New Jersey.

**Leperditella persimilis** Ulrich.

*Leperditella persimilis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637, pl. 43, figs. 4-6.

*Leperditia persimilis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 788 (gen. ref.).

Black River (Decorah): Minneapolis, Minnesota.

*Holotype*.—Cat. No. 41308, U.S.N.M.

**Leperditella sulcata** (Ulrich).

*Leperditia sulcata* Ulrich, Amer. Geol., 10, 1892, p. 266, pl. 9, figs. 19-21.

*Leperditella sulcata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46j.—

Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 23, fig. 14.

Black River (Lowville): High Bridge, Kentucky; Tennessee; Virginia.

*Holotype*.—Cat. No. 41313, U.S.N.M.

**Leperditella sulcata ventricornis** Ulrich.

*Leperditella sulcata* var. *ventricornis* Ulrich, Amer. Geol., 10, 1892, p. 266, pl. 9, figs. 22, 23; Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46k.

Black River (Lowville): High Bridge, Kentucky.

*Holotype*.—Cat. No. 41314, U.S.N.M.

**Leperditella tumida** (Ulrich).

*Leperditia tumida* Ulrich, Amer. Geol., 10, 1892, p. 264, pl. 9, figs. 1-3.

*Leperditella tumida* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 23, fig. 13.

Black River (Lowville): High Bridge, Kentucky; Tennessee; Virginia.

*Holotype*.—Cat. No. 41310, U.S.N.M.

**LEPERDITIA** Rouault.

Genotype: *L. brittanica* Rouault.

*Leperditia* Rouault, Bull. Soc. Geol. France, 2d ser., 8, 1851, p. 377.—Jones, Ann.

Mag. Nat. Hist., 2d ser., 1856, p. 84; Monthly Microsc. Jour., 4, 1870, pp.

188-190.—Barrande, Syst. Sil. du Centre Boheme, 1 Suppl., 1872, p. 523.—

Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 21, 1873.—Miller, Cincin-

nati Quart. Jour. Sci., 1, 1874, p. 121.—Alth, Anhandl. geol. Reichsanstalt, 7,

Heft 1, 1874, p. 66.—Nicholson and Lydecker, Man. Pal., 1, 1879, p. 506.—

Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 334.—Schmidt, Mem. l'Acad.

Imp. Sci. St. Petersburg, 31, 1883.—Vine, Proc. Yorkshire Geol. Polyt. Soc.,

n. s., 8, 1884, p. 234.—Zittel, Handb. Pal., 2, 1885, p. 551.—Jones and Kirkby,

Proc. Geol. Assoc., 9, 1887, p. 503.—Nicholson and Lydecker, Man. Pal., 1,

1879, p. 506.—Miller, N. A. Geol. Pal., 1889, p. 552.—Vogdes, Ann. New

York Acad. Sci., 5, 1889, p. 23, pl. 2, fig. 17.—Miller, N. A. Geol. Pal., 1st

App., 1892, p. 708.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 633.—Koken,

Die Leitfossilien, 1896, p. 40.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, p. 307;

ibid., 7, 1901, p. 218.—Ulrich, Zittel's Textb. Pal. (Amer. ed.), 1900, p.

643.—Grabau, Bull. New York State Mus., 45, 1901, p. 218.—Cumings, 32d

Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1041.—Grabau and Shimer,

N. A. Index Fossils, 2, 1910, p. 339.—Bassler, Zittel-Eastman Textb. Pal.,

2d ed., 1915, p. 737.



*LEPERDITIA ÆQUILATERA* Ulrich. See *Leperditella æquilatera*.

***Leperditia alta* (Conrad).**

*Cytherina alta* Conrad in Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 112, fig. 6.—Mather, Geol., New York, 1, 1843, p. 349, fig. 6.—Hall, *ibid.*, 4, 1843, p. 142, fig. 6; tab. ill. 26, fig. 6.—Owen, Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 47, fig. 6.—Emmons, Man. Geol., 1860, p. 113, fig. 102.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 58, pl. 9, fig. 6.

*Leperditia alta* Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 88, pl. 7, figs. 6, 7; *ibid.*, 3d ser., 1, 1858, p. 250, pl. 10, figs. 8, 9; Geol. Surv. Canada, dec. 3, p. 95.—Hall, Pal. New York, 3, 1859, p. 373, pl. 79a, figs. 6a-e.—Emerson(?) Narrative Hall's Sec. Arctic Exped., U. S. Navy Dep., 1879, p. 579, fig. 5.—Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 345.—Whitfield, Geol. Wisconsin, 4, 1882, p. 323, pl. 25, figs. 8, 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 198, fig.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 342; Quart. Jour. Geol. Soc. London, 44, 1890, p. 25, pl. 1, figs. 6a, b; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 84, pl. 13, figs. 10, 11.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, pp. 259, 265, pl. 24, figs. 25-28.—Grabau, Bull. New York State Mus., 92, 1906, p. 115, fig. 24a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 341.

Cayugan and Helderbergian: Manlius, etc., New York; New Jersey; etc.

*LEPERDITIA ALTA* Whitfield (1891). See *Leperditia ohioensis*.

***Leperditia altoides* Weller.**

*Leperditia altoides* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 252, pl. 23, figs. 1, 2.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 513, pl. 97, figs. 8, 9.

Helderbergian: Flatbrookville, New Jersey (Rondout); Devil's Backbone, near Cumberland and Tonoloway, Maryland (Keyser).

*LEPERDITIA ALTOIDES* Grabau. See *Leperditia ohioensis*.

***Leperditia amygdalina* Jones.**

*Leperditia amygdalina* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 341; Geol. Surv. Canada, dec. 3, 1858, p. 97, pl. 11, figs. 18, 19; Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 344, pl. 19, fig. 9; *ibid.*, 14, p. 342; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, pp. 98, 99.

Stones River (Pamelia): Near L'Original, Canada.

***Leperditia angulifera* Whitfield.**

*Leperditia angulifera* Whitfield, Ann. New York Acad. Sci., 2, 1882, p. 197; *ibid.*, 5, 518, pl. 5, figs. 28-30; Geol. Surv. Ohio, Pal., 7, 1893, p. 418, pl. 1, figs. 28-30.—Sherzer, Geol. Surv. Michigan, 7, pt. 1, 1900, pl. 17, figs. 28-30.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 340, fig. 1654.—Grabau, Michigan Geol. Surv., Geol., 1st ser., 1909, p. 203, pl. 30, figs. 28-30.

Lower Monroan (Greenfield): Greenfield, Ohio.

***Leperditia anna* Jones.**

*Leperditia anna* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 247, pl. 9, fig. 18; Geol. Surv. Canada, dec. 3, 1858, p. 96, pl. 11, fig. 13; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, pp. 98, 99.

Canadian (Beekmantown): St. Anne, Canada.

***Leperditia anticostiana* (Jones).**

*Leperditia Canadensis* var. *Anticostiana* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 95, pl. 11, fig. 17.

**Leperditia anticostiana**—Continued.

*Leperditia fabulites* var. *anticostiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 344, pl. 19, fig. 8.

*Leperditia Anticostiana* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 66.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 341.—Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76.

*Leperditia Anticostiensis* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 98, 99.

Anticostian (Jupiter River): East Point and Jumpers, Anticosti.

**LEPERDITIA ANTICOSTIENSIS** Jones. See *Leperditia anticostiana*.

**Leperditia appressa** Ulrich.

*Leperditia appressa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 176, pl. 11, figs. 5a-d.

Trenton (Perryville): Danville and Harrodsburg, Kentucky.

*Cotypes*.—Cat. Nos. 41281, 41282, U.S.N.M.

**Leperditia arctica** (Jones).

*Leperditia baltica* var. *arctica* Jones, in Salter Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., 1852, p. 221, pl. 5, fig. 13; *ibid.*, Quart. Jour. Geol. Soc. London, 9, 1853, p. 314.

*Leperditia arctica* Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 87, pl. 7, figs. 1-5.

Niagaran: Cape Hotham, Assistance Bay, Seal Island, Baring Bay, etc., Arctic America.

**LEPERDITIA (ISOCHILINA) ARMATA** Walcott. See *Isochilina armata*.

**LEPERDITIA BALTHICA** var. *b.* Kolmodin. See *Leperditia hisingeri*.

**Leperditia balthica guelfica** Jones.

*Leperditia balthica* var. *guelfica* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 80, pl. 13, figs. 12a, b, 13a-c.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 2, 1895, p. 106 (loc. occ.).—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 106, pl. 21, figs. 9-11.

Niagaran (Guelph): Durham and Aboyne, Ontario; Rochester, New York.

**Leperditia balthica primæva** Jones.

*Leperditia balthica* var. *primæva* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 70, pl. 10, fig. 18.

Stones River (Pamelia): Carleton County, Ontario.

**LEPERDITIA BALTICA** var. *ARCTICA* Jones. See *Leperditia arctica*.

**LEPERDITIA BILLINGSI** Jones. See *Aparchites billingsi*.

**LEPERDITIA BIVERTEX** Ulrich. See *Ulrichia bivertex*.

**Leperditia bivia** White.

*Leperditia bivia* White, Rep. U. S. Geogr. Surv. West 100th Merid., 4, 1877, p. 58, pl. 3, figs. 7a-d (Prelim. Rep. 1874, p. 11).—Walcott, U. S. Geol. Surv., Mon. 8, 1884, p. 88.

Upper Pogonip: Queen Spring Hill, Schell Creek Range, Nevada.

*Cotypes*.—Cat. No. 17411, U.S.N.M.

**LEPERDITIA BYRNEI** Miller. See *Dicranella? byrnei*.



**Leperditia caeca Jones.**

Leperditia caeca Jones, Contr. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 88, pl. 12, figs. 6, 7, 9.

Niagaran: Saskatchewan River, Canada.

**Leperditia caecigena Miller.**

Leperditia caecigena Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 263, pl. 6, figs. 5, 5a.—Ulrich, *ibid.*, 1891, p. 176, pl. 11, figs. 6a-d.—Miller, N. A. Geol. Pal., 1889, p. 552, fig. 1021.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1047, pl. 53, fig. 10-10c.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 340, fig. 1656d, e.

Richmond (Whitewater-Saluda): Versailles, Madison, etc., Indiana.

*Plesiotypes*.—Cat. No. 41276, U.S.N.M.

**Leperditia caecigena frankfortensis Ulrich.**

Leperditia caecigena var. frankfortensis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 277.

Trenton (Perryville): Reservoir Hill, Frankfort, Kentucky.

*Cotypes*.—Cat. No. 41279, U.S.N.M.

LEPERDITIA CANADENSIS Jones (part). See *Leperditia nana* and *L. canadensis*, louckiana.

**Leperditia canadensis Jones.**

Leperditia Canadensis Jones (part), Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 244, pl. 9, figs. 11-15.—Chapman, Canadian Jour., n. s., 8, 1863, p. 195, fig. 15; Expos. Min. Geol. Canada, 1864, p. 167, fig. 163.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 28 (loc. occ.).—Emerson(?), Narrative Hall's Sec. Arctic Exped., U. S. Navy Dep., 1879, p. 580, fig. 6.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1881, p. 340.—Dwight, Trans. Vassar Bros. Inst. 5, 1890, p. 76.—Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

Canadian (Beekmantown): Grenville, etc., Quebec.

LEPERDITIA CANADENSIS var. ANTICOSTIANA Jones. See *Leperditia anticostiana*.

LEPERDITIA CANADENSIS var. JOSEPHIANA Jones. See *Leperditia fabulites*.

**Leperditia canadensis labrosa Jones.**

Leperditia Canadensis var. labrosa Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 245, pl. 9, fig. 13; Geol. Surv. Canada, 3, 1858, p. 93, pl. 11, fig. 8; Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 343; Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

Chazy (Aylmer): Hawkesbury, Ontario.

**Leperditia canadensis louckiana Jones.**

Leperditia Canadensis var. Louckiana Jones, Geol. Surv. Canada, dec. 3, 1858, p. 93, pl. 11, fig. 11; Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

Leperditia canadensis? Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 245, pl. 9, figs. 16, 17.

Leperditia fabulites var. louckiana Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 343.

Leperditia louckiana Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 340.—Dwight, Vassar Bros. Inst., 5, 1890, p. 76 (loc. occ.).

Trenton: Loucks Mill, Castor River, Canada.

*LEPERDITIA CANADENSIS* var. *NANA* Jones. See *Leperditia nana*.

***Leperditia canadensis pauquettiana* Jones.**

*Leperditia Canadensis* var. *Pauquettiana* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 94, pl. 11, fig. 12; Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

*Leperditia fabulites* var. *pauquettiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 343.

Black River (Leray): Pauquette's Rapids, Allumette Island, Ottawa River, Canada.

*LEPERDITIA CANALIS* Miller. See *Leperditella canalis*.

***Leperditia capax* Safford.**

*Leperditia capax* Safford, Geol. Tennessee, 1869, p. 290 (nom. nud.).

Trenton: Nashville, Tennessee.

*LEPERDITIA CLAYPOLEI* Jones. See *Primitiella claypolei*.

***Leperditia concinnula* Billings.**

*Leperditia concinnula* Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 299.

Chazyan (Quebec-L, M): Point Rich and Table Head, Newfoundland.

*LEPERDITIA CREPIFORMIS* Ulrich. See *Jonesella crepidiformis*.

***Leperditia cylindrica* (Hall).**

*Cytherina cylindrica* Hall, Pal. New York, 2, 1852, p. 14, pl. 4, figs. 8a, b.

*Leperditia (Isochilina) cylindrica* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 253.

*Leperditia cylindrica* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80 (gen. ref.).—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 344.

*Isochilina cylindrica* Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 218; Bull. New York State Mus., 45, 1901, p. 218.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 342.

Upper Medinan: Medina, Lockport, etc., New York.

*LEPERDITIA (ISOCHILINA) CYLINDRICA* Hall. See *Bythocypris cylindrica*.

*LEPERDITIA (?PRIMITIA) DORSICORNIS* Ulrich. See *Primitia dorsicornis*.

***Leperditia elongata* Weller.**

*Leperditia elongata* Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 259, pl. 23, fig. 13.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 514, pl. 97, fig. 11.

Helderbergian: Two miles south of Tristates, New York (Rondout); Tonoloway, Maryland (Keyser).

***Leperditia faba* Hall.**

*Leperditia faba* Hall, 28th Rep. New York State Mus., doc. ed., 1875, pl. 32, figs. 1-3; mus. ed., p. 186, pl. 32, figs. 1-3; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 331, pl. 34, figs. 1-3.

Niagaran (Waldron): Waldron, Indiana.

***Leperditia fabulites* (Conrad).**

*Cytherina* sp. Hall, Pal. New York, 1, 1847, p. 44, pl. 10, fig. 12.

*Cytherina fabulites* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 332.

*Leperditia fabulites* Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 89; *ibid.*, 3d ser., 1, 1858, p. 341; *ibid.*, 5th ser., 8, 1881, p. 342, pl. 20, fig. 4; *ibid.*, 5th ser., 14, 1884, p. 342.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—



**Leperditia fabulites**—Continued.

- Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 173, pl. 11, figs. 1a, d, 2.—Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 98, 99.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 634, pl. 43, figs. 10–14.—Ruedemann, Bull. New York State Mus., 49, 1902, p. 70, pl. 5, figs. 19, 20.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 208, pl. 13, figs. 11, 12.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 1.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 3, figs. 3–7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 340, fig. 1653.
- Leperditia canadensis* var. *josephiana* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 341; Geol. Surv. Canada, dec. 3, 1858, p. 94, pl. 11, fig. 16.
- Leperditia fabulites josephiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 1881, p. 344, pl. 19, fig. 7; pl. 20, figs. 7, 8.
- Leperditia josephiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 341; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 97 (loc. occ.).—Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76 (loc. occ.).
- Black River: Mineral Point, etc., Wisconsin; Minnesota; New York; Canada; etc.
- Stones River: Tennessee, etc.
- Plesiotypes*.—Cat. Nos. 41263, 41267, U.S.N.M. (Ulrich).

**LEPERDITIA FABULITES** var. **ANTICOSTIANA** Jones. See *Leperditia anticostiana*.

**LEPERDITIA FABULITES** var. **JOSEPHIANA** Jones. See *Leperditia fabulites*.

**LEPERDITIA FABULITES** var. **LOUCKIANA** Jones. See *Leperditia canadensis* var. *louckiana*.

**LEPERDITIA FABULITES** var. **PAUQUETTIANA** Jones. See *Leperditia canadensis* var. *pauquettiana*.

**LEPERDITIA FIMBRIATA** Ulrich. See *Aparchites fimbriatus*.

**Leperditia fonticola** Hall.

- Leperditia fonticola* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 335, pl. 21 (12), figs. 1–3; rev. ed., 1870, p. 428, pl. 21, figs. 1–3.
- Niagaran (Byron): Fond du Lac, Wisconsin.

**Leperditia frontalis** Jones.

- Leperditia frontalis* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 547, pl. 21, figs. 8a, 8b.
- Anticostian (Jupiter River): Near The Jumpers, Anticosti.

**LEPERDITIA GERMANA** Ulrich. See *Leperditella germana*.

**Leperditia gibbera** Jones.

- Leperditia gibbera* Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 90, pl. 7, figs. 8–10.
- Niagaran: Beechy Island, Lancaster Sound, Arctic America.

**LEPERDITIA GIBBERA** var. **SCALARIS** Jones. See *Leperditia scalaris*.

**Leperditia gigantea** Weller.

- Leperditia gigantea* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 260, pl. 23, fig. 14.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 514, pl. 97, fig. 10.
- Helderbergian: Two miles south of Tristates, New York (Rondout); Tonoloway, Maryland (Keyser).

**LEPERDITIA (ISOCHILINA) GRACILIS** Jones. See *Isochilina gracilis*.

*LEPERDITIA GRANILABIATA* Ulrich. See *Aparchites granilabiatus*.

***Leperditia hisingeri* Schmidt.**

*Cytherina balthica* (part) Hisinger, Leth. Suecica, 1837, p. 10, pl. 30, fig. 1.

*Cythere balthica* Roemer, Bronn's Leth. Geogn., 2, 1854, p. 528 (part), pl. 9, fig. 8a-c.

*Leperditia balthica* (part) Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 85, pl. 6, figs. 3a-e; *ibid.*, 5th ser., 8, 1881, p. 333, pl. 19, figs. 10, 11.

*Leperditia balthica* var. b. Kolmodin, Bidrag till Kannedomen om Sveriges Silurika Ostracoder, 1869, p. 14, figs. 4, 5.

*Leperditia hisingeri* Schmidt, Mem. Acad. Imp. Sci. St. Petersburg, 7th ser., 21, 1873, p. 16, fig. 23; *ibid.*, 31, 1883, p. 14, pl. 5, figs. 5-7.—Jones, Geol. Surv. Canada, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 82, pl. 13, figs. 1, 9.—Krause, Zeits. d. d. geol. Gesell., 43, 1891, p. 489, pl. 29, fig. 4.

*Leperditia schmidti* Kolmodin, Ofvers. Vet.-Akad. Forh., 36, 1880, p. 133.

Silurian: Europe; Long Point, Lake Winnipegosis, Grand Rapids, Saskatchewan River, and Beechy Island, Lancaster Sound, Canada.

***Leperditia hisingeri egena* Jones.**

*Leperditia Hisingeri* var. *egena* Jones, Geol. Surv. Canada, Contr. Micro-Pal., pt. 3, 1891, p. 82, pl. 12, fig. 8.

Niagaran: Grand Rapids, Saskatchewan River, Canada.

***Leperditia hisingeri fabulina* Jones.**

*Leperditia Hisingeri* var. *fabulina* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 82, pl. 10, figs. 5, 7; pl. 12, fig. 15; pl. 13, figs. 2, 3, 5, 6.

Niagaran: Long Point, Lake Winnipegosis, and foot of Grand Rapids, Saskatchewan River, Canada.

***Leperditia hisingeri gibbera* Jones.**

*Leperditia Hisingeri* var. *gibbera* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 82, pl. 13, fig. 4.

Niagaran: Long Point, Lake Winnipegosis, Canada.

***Leperditia illinoisensis* Savage.**

*Leperditia illinoisensis* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 123, pl. 7, fig. 27.

Upper Medinan (Channahon): Will County, Illinois.

*LEPERDITIA INFLATA* Ulrich. See *Leperditella inflata*.

***Leperditia jonesi* Hall.**

*Leperditia jonesi* Hall, Pal. New York, 3, 1859, p. 372; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 342.—Schuchert, Amer. Geol., 31, 1903, p. 169.

*Cytherina alta*? Conrad, Hall, Pal. New York, 2, 1852, p. 338, pl. 78, figs. 2a-d. Cayugan (Cobleskill): Schoharie, New York.

*LEPERDITIA JOSEPHIANA* Jones. See *Leperditia fabulites*.

***Leperditia limatula* Raymond.**

*Leperditia limatula* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 380; Ann. Carnegie Mus., 7, 1911, p. 253, fig. 25.

Chazyan: Valcour Island, Valcour and Chazy, New York (Crown Point); East Tennessee (Lenoir).



**Leperditia linneyi** Ulrich.

*Leperditia linneyi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 174, pl. 11, figs. 3a-3e.

Trenton (Perryville): Harrodsburg, Frankfort, etc., Kentucky.

*Cotypes*.—Cat. No. 41272, U.S.N.M.

**LEPERDITIA LOUCKIANA** Jones. See *Leperditia canadensis louckiana*.

**LEPERDITIA MACRA** Miller. See *Leperditella macra*.

**Leperditia marginata** Schmidt.

*Leperditia marginata* Schmidt, Mem. Imp. Acad. Sci. St. Petersburg, 7th ser., 21, 1873, p. 19, pl., fig. 29; *ibid.*, 31, 1883, p. 18, pl. 1, figs. 13-19.—Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 86, pl. 10, figs. 6a-c.

Silurian: Russia; east side of Lake Winnipegosis, Canada.

**LEPERDITIA MARGINATA** Jones. See *Isochilina grandis* and *I. grandis latimarginata*.

**LEPERDITIA MILLEPUNCTATA** Ulrich. See *Aparachites millepunctata*.

**LEPERDITIA (ISOCHILINA) MINUTISSIMA** Hall. See *Aparachites minutissimus*.

**Leperditia morgani** Safford.

*Leperditia Morgani* Safford, Geol. Tennessee, 1869, p. 290 (nom. nud.)

Trenton: Nashville, Tennessee.

**LEPERDITIA MUNDULA** Ulrich. See *Leperditella mundula*.

**Leperditia nana** (Jones).

*Leperditia canadensis* Jones (part), Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 244; Contr. to Canadian Micro-Pal., 1891, p. 97.

*Leperditia canadensis* var. *nana* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 92, pl. 2, figs. 6, 7, 9, 10; Ann. Mag. Nat. Hist., 5th ser., 8, p. 343.

*Leperditia nana* Raymond, Ann. Carnegie Mus., 7, 1911, p. 254.

Canadian (Beekmantown): Grenville, Quebec.

?Chazyan: Valcour Island, Crown Point, etc., New York.

**LEPERDITIA? OBSCURA** Jones. See *Leperditella obscura*.

**Leperditia ohioensis** Bassler (new name).

*Leperditia alta* Whitfield (not Conrad), Ann. New York Acad. Sci., 5, 1891, p. 517, pl. 5, fig. 27; Geol. Surv. Ohio, Pal., 7, 1893, pp. 417-418, pl. 1, fig. 27.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 187, pl. 17, figs. 2a, b.

*Leperditia altoides* Grabau (not Weller), Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 205, pl. 30, fig. 27.

Lower Monroan (Greenfield): Greenfield and Ballville, Ohio.

**LEPERDITIA (ISOCHILINA) OTTAWA** Jones. See *Isochilina ottawa*.

**Leperditia ovata** Jones.

*Leperditia ovata* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 252, pl. 10, fig. 14; Geol. Pennsylvania, 2, pt. 2, 1858, p. 834, fig. 697.

Trenton: Potter's Fort, Penns Valley, Pennsylvania.

**Leperditia parvula** Hall.

Not recognized.

*Leperditia parvula* Hall, Pal. New York, 3, 1859, p. 376.

Tentaculite limestone: Herkimer County, New York.

**Leperditia pennsylvanica** Jones.

Leperditia Pennsylvanica Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 251, pl. 10, figs. 12, 13.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 834, fig. 699.

Clinton: Near Barre Forge, Pennsylvania.

LEPERDITIA PERSIMILIS Miller. See Leperditella persimilis.

**Leperditia phaseolus** (Hisinger).

Cytherina phaseolus Hisinger, Leth. Sues., 1837, p. 9, pl. 1, fig. 1.

Leperditia phaseolus Jones, Contr. Canadian Micro-Pal., 3, 1891, p. 85, pl. 13, figs. 7, 8.

Silurian: Europe; Saskatchewan River, at Roche Rouge, Canada.

**Leperditia phaseolus guelphica** Jones.

Leperditia phaseolus var. guelphica Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 86, fig. 5.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 2, 1895, p. 106 (loc. occ.).

Niagaran (Guelph): Durham, Ontario.

LEPERDITIA RADIATA Ulrich. See Elpe radiata.

**Leperditia resplendens** Ruedemann.

Leperditia resplendens Ruedemann, Bull. New York State Mus., 49, 1901, p. 71, pl. 5, figs. 21–27.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

**Leperditia scalaris** (Jones).

Leperditia gibbera var. scalaris Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 250, pl. 10, figs. 10, 11.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 834, fig. 698.

Leperditia scalaris Grabau, Bull. Geol. Soc. Amer., 11, 1900, p. 371, pl. 22, figs. 6a–d; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 219, fig. 150; Bull. New York State Mus., 45, 1901, p. 219, fig. 150; ibid., Bull. 92, 1906, p. 111; Michigan Geol. Surv., Geol., 1st ser., 1909, p. 202, pl. 32, fig. 6a–d.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 340, fig. 1655.

Cayugan: Williamsville, Buffalo, Akron, etc., New York; Ontario (Akron); Schoharie and High Falls, New York (Cobleskill).

LEPERDITIA SCHMIDTI Kolmodin. See Leperditia hisingeri.

**Leperditia selwyni** Jones.

Leperditia selwynii Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 89, pl. 12, figs. 1–5.

Anticostian (Jupiter River): Jupiter River, Anticosti.

**Leperditia sinuata** Hall.

Leperditia sinuata Hall, Canadian Nat. Geol., 5, 1860, p. 158.—Dawson, Acadian Geol., 2d ed., 1868, p. 609.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 24, pl. 1, figs. 12a–c.

Silurian: Arisaig, Nova Scotia.

**Leperditia subcylindrica** Ulrich.

Leperditia subcylindrica Ulrich, Cont. Micro-Pal., Geol. Surv. Canada, pt. 2, 1889, p. 49, pl. 9, figs. 4–4b.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 2, 1895, p. 125.

Richmond (Stony Mountain): Stony Mountain, Manitoba.

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**Leperditia sublaevis** (Shumard).

*Cythere sublaevis* Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, 2, 1855, p. 195, pl. 8, fig. 15.

*Leperditia sublaevis* Keyes, Missouri Geol. Surv., 4, 1894, p. 239.

St. Peter (Joachim): St. Louis, Ste. Genevieve, and Ralls Counties, Missouri.

**LEPERDITIA SULCATA** Ulrich. See *Leperditella sulcata*.

**Leperditia symmetrica** Holtedahl.

*Leperditia symmetrica* Holtedahl, 2d Arct. Exp., 1898-1902, No. 32, 1914, p. 37, pl. 8, fig. 15.

Helderbergian (Lower beds): Southwestern Ellesmereland, Arctic America.

**LEPERDITIA TUMIDA** Ulrich. See *Leperditella sulcata*.

**Leperditia tumidula** Ulrich.

*Leperditia tumidula* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 175, pl. 11, figs. 4a-c.

Trenton (Perryville): Danville, Kentucky.

*Holotype*.—Cat. No. 41284, U.S.N.M.

**Leperditia turgida** Billings.

*Leperditia turgida* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 299.

Canadian (Quebec—F, II): Port aux Choix and Cape Norman, Newfoundland.

**LEPERDITIA UNICORNIS** Ulrich. See *Primitiella unicornis*.

**Leperditia ventralis** Billings.

*Leperditia ventralis* Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 300.

Chazyan (Quebec—N): Bonne Bay, Newfoundland.

**Leperditia whiteavesi** Jones.

*Leperditia Whiteavesi* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 87, fig. 6; pl. 12, figs. 11-14.

Niagaran: Chemahawin and Old Fort Island, Cedar Lake, Saskatchewan River, Canada.

**LEPIDOCOLEUS** Faber.

Genotype: *Plumulites jamesi* Hall and Whitfield.

*Lepidocoleus* Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 15.—Miller, N. A.

Geol. Pal., 1889, p. 553; *ibid.*, 1st App., 1892, p. 709.—Clarke, Amer. Geol., 17, 1896, pp. 137, 139; Zittel-Eastman Textb. Pal., 1900, p. 649; *ibid.*, 2d ed., 1913, p. 743.

**Lepidocoleus jamesi** (Hall and Whitfield).

*Plumulites Jamesi* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 106, pl. 4, figs. 1-3.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 274, fig. 19.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 723, figs.

*Lepidocoleus Jamesi* Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 15, pl. 1, figs. A-F.—Hall and Clarke, Pal. New York, 7, 1888, p. 64, fig.—Miller, N. A. Geol. Pal., 1889, p. 553, figs. 1022-1023.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 32.—Clarke, Amer. Geol., 17, 1896, pp. 137-143, pl. 7, fig. 9.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 521, pl. 2, figs. 10-12.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1050, pl. 53, figs. 13-13d.

Trenton and Cincinnati: Cincinnati, Ohio, and vicinity; Saratoga County, New York.

**Lepidocoleus sarlei** Clarke.

*Lepidocoleus sarlei* Clarke, Amer. Geol., 17, 1896, pp. 14-143, pl. 7, figs. 1-6.—

Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 371, fig. 1671.

Clinton (Rochester): Rochester, New York.

**LEPIDODISCUS CININNATIENSIS** Sharman and Newton. See *Agelacrinites cincinnatiensis*.

**LEPIDODISCUS FABERI** Cumings. See *Agelacrinites faberi*.

**LEPIDODISCUS PILEUS** Sladen. See *Agelacrinites pileus*.

**LEPIDOLITES** Ulrich.

Genotype: *L. dickhauti* Ulrich.

*Lepidolites* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 20.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 67, pl. F, figs. 11, 12 (extras, 1893).—Ulrich, Amer. Geol., 1, 1888, p. 324.—Miller, N. A. Geol. Pal., 1889, p. 160.

*Ischadites* James, Jour. Cincinnati Soc. Nat. Hist., 8, 1885, p. 163.

*Receptaculites* James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 60.

**Lepidolites dickhauti** Ulrich.

*Lepidolites dickhauti* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 21, pl. 7, figs. 17-17b.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 67, pl. F, figs. 11, 12.

*Ischadites dickhauti* James, Jour. Cincinnati Soc. Nat. Hist., 8, 1885, p. 165; *ibid.*, 9, 1886, p. 249.

*Receptaculites dickhauti* James, *ibid.*, 14, 1891, p. 63.

*Lepidolites elongatus* Ulrich, *ibid.*, 2, 1879, p. 22, pl. 7, fig. 16.

*Ischadites elongatus* James, *ibid.*, 8, 1885, p. 165.

Eden (Southgate): Covington, Kentucky.

*Cotypes*.—Cat. No. 46533, U.S.N.M.

**LEPIDOLITES ELONGATUS** Ulrich. See *Lepidolites dickhauti*.

**LEPOCRINITES** Conrad.

Genotype: *L. gebhardi* Conrad.

*Lepocrinites* Conrad, Ann. Rep. New York Geol. Surv., 1840, p. 207.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 117, fig. 4.—Mather, *ibid.*, 1, 1843, p. 346, fig. 4.—Schuchert, Smiths. Misc. Coll., 47, 1904, p. 213.

*Lepocrinus* or *Lepadocrinus* Hall, Pal. New York, 3, 1859, p. 125, pl. 7, figs. 1-20.

*Apiocystites* Jaekel (part), Stammesg. Pemat., Berlin, 1, 1899, p. 279, fig. 59.

*Lepadocrinus* Bather (part), Treatise Zool., pt. 3, Echinoderma, London, 1900, p. 61.—Haeckel, Die Amphorideen und Cystoideen, Leipzig, 1896, p. 134.

**Lepocrinites gebhardi** Conrad.

*Lepocrinites gebhardi* Conrad, 4th Ann. Rep. New York Geol. Surv., 1840, p. 207.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 117, fig. 4.—Mather, *ibid.*, 1, 1843, p. 346, fig. 4.—Hall, *ibid.*, 4, 1843, tab. ill. 27, fig. 4.—Owen, Amer. Jour. Sci., 2d ser., 1846, p. 49, fig. 4.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 58, pl. 9, fig. 2.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 215.

*Lepocrinus gebhardi* Hall, Pal. New York, 3, 1859 (1861), p. 127, pl. 7, figs. 1-20.—Haeckel, Die Amphorideen und Cystoideen, Leipzig, 1896, p. 135.

*Apiocystites gebhardi* Jaekel, Stammesg. Pemat., 1, Berlin, 1899, p. 282, fig. 59.

Helderbergian (Manlius transition beds or Coeymans): Schoharie, etc., New York.



**Lepocrinites manlius** Schuchert.

*Lepocrinites manlius* Schuchert, Smiths. Misc. Coll., 47, 1904, p. 214, pl. 37, figs. 2, 3; pl. 39, figs. 15, 16; text fig. 23; Maryland Geol. Surv., Low. Dev., 1913, p. 231, pl. 32, figs. 8, 9; pl. 35, figs. 15, 16.

Helderbergian (Keyser): Keyser, West Virginia.

*Holotype*.—Cat. No. 35062, U.S.N.M.

**LEPOCRINITES MOOREI** Meek. See *Lepadocystis moorei*.

**LEPOCRINUS** Hall. See *Lepocrinites* Conrad.

**LEPTÆNA** Dalman.

Genotype: *Productus rugosa* Hisinger = *Conchita rhomboidalis* Wilckens.

*Leptæna* Dalman, Kongl. Svenska Vet.-Akad. Handl., for 1827, 1828, pp. 93, 94.—King, Mon. Permian Foss., Pal. Soc., 1850, p. 104.—Billings, Canadian Nat. Geol., 1, 1856, p. 133.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 60.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, Jan., p. 56.—Zittel, Handb. Pal., 1, 1880, p. 678.—Winchell, 9th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 118.—Miller, N. A. Geol. Pal., 1889, p. 347.—Beecher, Amer. Jour. Sci., 3d ser., 44, 1892, pp. 145, 147.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 276.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 409.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 277.—Koken, Die Leitfossilien, Leipzig, 1896, p. 237, fig. 198, 4-6.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, 313.—Grabau, Bull. New York State Mus., 45, 1901, p. 180; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 180.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 225.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 889.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 384.

*Leptagonia* McCoy, Carb. Foss. Ireland, 1844, p. 116, figs. 11-13.—D'Orbigny, Compt. Rend. de l'Acad. Sci., 25, 1847, p. 267.—McCoy, British Pal. Rocks and Foss., 1854, p. 247.—Zittel, Handb. Pal., 1, Munich, 1880, p. 678.—Winchell, 9th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 118.—Koken, Die Leitfossilien, Leipzig, 1896, p. 237, fig. 198, 4-6.

*Plectambonites* Oehlert, Fischer's Manual Conch., 1887, p. 1283.

**LEPTÆNA ALTERNATA** Conrad. See *Rafinesquina alternata*.

**LEPTÆNA ALTERNISTRIATA** Hall. See *Rafinesquina alternata alternistriata*.

**LEPTÆNA ASPERA** James. See *Plectambonites rugosa*.

**LEPTÆNA BARABUENSIS** Whitfield. See *Syntrophia barabuensis*.

**LEPTÆNA BIPARTITA** Hall. See *Stropheodonta (Leptostrophia) bipartita*.

**LEPTÆNA CAMERATA** Hall. See *Rafinesquina deltoidea*.

**Leptæna charlottæ** Winchell and Schuchert.

*Leptæna charlottæ* Winchell and Schuchert, Amer. Geol., 9, April 1, 1892, p. 288; Geol. Minnesota, 3, 1893, p. 410, pl. 32, figs. 1-5.

*Strophomena halli* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, April 9, 1892, p. 334, pl. 4, figs. 36-38.

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

**LEPTÆNA CORRUGATA** Hall. See *Stropheodonta corrugata* and *S. corrugata pleuristriata*.

**LEPTÆNA DECIPIENS** Billings. See *Leptella decipiens*.

**LEPTÆNA DEFLECTA** Hall. See *Dinorthis (Plæsiomys) deflecta*.

*LEPTÆNA DELTOIDEA* Hall. See *Rafinesquina deltoidea*.

*LEPTÆNA DELTOIDES* Owen. See *Rafinesquina minnesotensis*.

*LEPTÆNA DEPRESSA* Hall. See *Leptæna rhomboidalis*.

*LEPTÆNA EUGLYPHA* Hisinger. See *Strophonella euglypha*.

*LEPTÆNA FASCIATA* Hall. See *Leptæna incrassata*.

\**LEPTÆNA FILITEXTA* Hall. See *Strophomena incurvata*.

*LEPTÆNA GIBBOSA* Miller. See *Plectambonites gibbosus*.

***Leptæna gibbosa* (James).**

*Strophomena gibbosa* James, Cincinnati Quart. Jour. Sci., 1, 1874, p. 333.

*Leptæna gibbosa* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 316; *ibid.*, 17, 1912, p. 116, pl. 1, figs. 5a-c.

Eden (Economy): Cincinnati, Ohio, and vicinity; Boyd and north of Ford, Kentucky.

***Leptæna gibbosa invenusta* Foerste.**

*Leptæna gibbosa invenusta* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 315, pl. 7, fig. 3.

Eden (Fulton or Lower Economy): Two miles west of Drennan Springs, Kentucky.

*LEPTÆNA GLABRA* Foerste. See *Plectambonites glaber*.

***Leptæna incrassata* Hall.**

*Leptæna incrassata* Hall, Pal. New York, 1, 1847, p. 19, pl. 4 bis, figs. 2a-c.—Rogers, Geol. Pennsylvania, pt. 2, 1858, p. 817, fig. 519.

*Strophomena incrassata* Billings, Canadian Nat. and Geol., 4, 1859, p. 443.—Winchell and Schuchert, Pal. Minnesota, 3, pt. 1, 1893, p. 410.—Raymond, Carnegie Mus., 7, 1911, p. 230, pl. 34, figs. 32-37, figs. 1-5.

*Leptæna fasciata* Hall, Pal. New York, 1, 1847, p. 19, pl. 4 bis, figs. 3a, b (not 3c).

*Strophomena fasciata* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 235, pl. 3, fig. 24.—Hall, 12th Ann. Rep. New York State Cab. Nat. Hist., 1858, p. 70.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1126, fig.

*Rafinesquina fasciata* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 283.

*Leptæna plicifera* Hall, Pal. New York, 1, 1847, p. 19, pl. 4 bis, fig. 1.

*Strophomena plicifera* Emmons, Amer. Geology, 1, pt. 2, 1855, pl. 3, figs. 21b, c.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70.

*Dalmanella?* *plicifera* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 202.

Chazy: Mingan Islands, Canada (Mingan); Chazy, Valcour Island, Crown Point, etc., New York (Crown Point, Valcour).

*LEPTÆNA INCRASSATA* Hall. See *Rafinesquina incrassata*.

***Leptæna julia* (Billings).**

*Strophomena julia* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 127, fig. 105 (adv. sheets, 1862).

*Leptæna julia* Shaler, Bull. Mus. Comp. Zool., 1865, p. 65.

Anticostian (Jupiter River): The Jumpers, Anticosti.

*LEPTÆNA MELITA* Hall and Whitfield. See *Dalmanella melita*.

*LEPTÆNA MESACOSTA* Shumard. See *Rafinesquina mesicosta*.

*LEPTÆNA MINNESOTENSIS* Sardeson. See *Plectambonites minnesotensis*.



**Leptæna nitens** (Billings).

*Strophomena nitens* Billings, Canadian Nat. Geol., 5, 1869, p. 53, fig. 1; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 118, fig. 97 (adv. sheets, 1862); Geol. Canada, 1863, p. 209, fig. 208.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1130, figs.

*Rafinesquina nitens* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 283.

*Leptæna nitens* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 120.

Richmond: Charleton Point, etc., Anticosti (Charleton and English Head and Gamachian); Stony Mountain, Manitoba (Stony Mountain); Wyoming; etc.

**LEPTÆNA OBSCURA** Hall. See *Rafinesquina obscura*.

**LEPTÆNA ORTHIDIDEA** Hall. See *Strophomena?* *orthididea*.

**LEPTÆNA PATENTA** Hall. See *Strophonella patenta*.

**LEPTÆNA PLANOCONVEXA** Hall. See *Strophomena planoconvexa*.

**LEPTÆNA PLANUMBONA** Hall. See *Strophomena planumbona*.

**LEPTÆNA PLICATELLA** Ulrich. See *Plectambonites plicatellus*.

**LEPTÆNA PLICIFERA** Hall. See *Leptæna incrassata*.

**LEPTÆNA PRECOSIS** Sardeson. See *Plectambonites precosis*.

**LEPTÆNA PROFUNDA** Hall. See *Stropheodonta profunda*.

**LEPTÆNA PROLONGATA** Foerste. See *Plectambonites transversalis prolongatus*.

**LEPTÆNA QUADRILATERA** Shaler. See *Leptæna rhomboidalis*.

**LEPTÆNA RECEDENS** Sardeson. See *Plectambonites recedens*.

**LEPTÆNA RECTA** Hall. See *Dinorthis* (*Plæsiomys*) *deflecta*.

**Leptæna reticulata** (Shaler).

*Strophomena reticulata* Shaler, Bull. Mus. Comp. Zool., 4, 1865, p. 62.

Richmond (Charleton) and Gamachian (Ellis Bay): Ellis Bay, Anticosti.

**Leptæna rhomboidalis** (Wilckens).

*Conchita rhomboidalis* Wilckens, Nachricht von selten Versteinerungen, 1769, p. 77, pl. 8, figs. 43, 44.

*Anomites rhomboidalis* Wahlenberg, Acta Soc. Upsala, 3, 1821, p. 65.

*Strophomena undulosa* Conrad, 5th Ann. Rep. Geol. Surv. New York, 1841, p. 54.

*Strophomena depressa* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 79, fig. 5.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 77, fig. 5; p. 104, fig. 2.—Billings, Canadian Nat. Geol., 1, 1856, p. 59, pl. 1, fig. 5.—Roemer, Sil. Fauna West. Tennessee, 1860, p. 65, pl. 5, fig. 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1126, figs.

*Strophomena undulatus* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 139, fig. 3.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 175, fig. 3.—Yandell and Shumard, Cont. Geol. Kentucky, 1847, p. 11.

*Productus?* *sulcatus* Castelnau, Essai Syst. Sil. l'Amérique Septentrionale, 1843, p. 39, pl. 13, fig. 7.

*Productus sulcifer* de Verneuil, *ibid.*, 1843, p. 39.

*Leptæna depressa* Hall, Pal. New York, 2, 1852, p. 62, pl. 21, fig. 8; p. 257, pl. 53, fig. 6.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 630.

**Leptaena rhomboidalis**—Continued.

*Strophomena rugosa* Hall, Pal. New York, 3, 1859, p. 195, pl. 19, fig. 1.—Safford, Geol. Tennessee, 1869, p. 315, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 383, fig. 623.—Lesley, Rep. Geol. Surv. Pennsylvania, P 4, 1890, p. 1138, fig.

*Strophomena rhomboidalis* Billings, Canadian Jour., 6, 1861, p. 336, figs. 111, 112; Geol. Canada, 1863, p. 311, fig. 314; p. 367, fig. 373; Proc. Portland Soc. Nat. Hist., 1863, p. 107, pl. 3, fig. 1.—Chapman, Expos. Min. and Geol. Canada, 1864, p. 115, fig. 96; p. 193, fig. 232.—Hall, Pal. New York, 4, 1867, p. 76, pl. 12, figs. 16-18; p. 414, pl. 15, figs. 15, 16.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 426, pl. 10, fig. 7.—Davidson, Mon. British Sil. Brach., Pal. Soc., 1871, p. 281, pl. 39, figs. 1-21; pl. 44, fig. 1.—Billings, Pal. Foss., 2, 1874, p. 27.—White, Wheeler's Expl. Surv. West 100th Merid., 4, 1875, p. 85, pl. 5, fig. 5.—Hall and Whitfield, King's U. S. Geol. Expl. 40th Parl., 4, 1877, p. 253, pl. 4, fig. 4.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 151, pl. 22, figs. 4-10; 11th Rep. State Geol. Indiana, 1882, p. 288, pl. 22, figs. 4-10; 2d Ann. Rep. New York State Geol., 1883, pl. 38, figs. 17-31.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 118.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, pl. 22, fig. 1.—Herrick, Amer. Geol., 3, 1889, pl. 4, fig. 6.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 18, pl. 2, figs. 1-13.—Nettleroth, Kentucky Fossil Shells, Mem. Geol. Surv. Kentucky, 1889, p. 150, pl. 18, figs. 1-3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1131, figs.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 298.—Beecher, Amer. Jour. Sci., 3d ser., 41, 1891, p. 357, pl. 17, figs. 13-21.—Herrick, Geol. Ohio, 7, 1895, pl. 20, fig. 6.

*Strophomena analoga* Davidson, Quart. Jour. Geol. Soc. London, 19, 1863, p. 173, pl. 9, fig. 18.—Dawson, Acadian Geol., 3d ed., 1878, p. 295, fig. 95.

*Leptæna quadrilatera* Shaler, Bull. Mus. Comp. Zool., 4, 1865, p. 65.

*Leptæna rhomboidalis* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 279, pl. 8, figs. 17-31; pl. 15A, figs. 40-42; pl. 20, figs. 21-24.—Foerste, Geol. Ohio, 7, 1895, p. 566.—Weller, Jour. Geol., 3, 1895, p. 912.—Girty, Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 525; 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 563.—Clarke, Mem. New York State Mus., 3, 1900, p. 57.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 180, fig. 84.—Weller, Trans. Acad. Sci. St. Louis, 11, 1901, p. 159, pl. 14, figs. 19, 20; p. 180, pl. 16, figs. 7, 8.—Kindle, 25th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1901, p. 593, pl. 4, fig. 5.—Weller, Jour. Geol., 9, 1901, p. 136.—Grabau, Bull. New York State Mus., 45, 1901, p. 180, fig. 84.—Ruedemann, Bull. New York State Mus., 49, for 1901, 1902, p. 18.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 42.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 228, pl. 20, fig. 10; p. 278, pl. 27, fig. 9; p. 302, pl. 33, fig. 10; p. 325, pl. 41, fig. 10; p. 366, pl. 51, fig. 19.—Girty, U. S. Geol. Surv., Prof. Paper 21, 1904, p. 48, pl. 10, fig. 3.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 431, pl. 2, fig. 17.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 226, figs. 273a-b.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 20.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 308, pl. 56, figs. 13-17.—Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 47, pl. 1, fig. 11; pl. 4, fig. 3, p. 72.

*Leptæna* (*Strophomena*) *rhomboidalis* Beecher, Amer. Jour. Sci., 3d ser., 46, 1892, p. 150, pl. 1, figs. 7-9.

*Plectambonites rhomboidalis* Keyes, Geol. Surv. Missouri, 5, 1895, p. 70, fig. 6.

Silurian-Mississippian: Widely distributed throughout Europe and America.

*Plesiotypes*.—Cat. Nos. 56722, 56723, U.S.N.M.

**Leptæna richmondensis** Foerste.

*Leptæna tenuistriata* Hall (part), Pal. New York, 1, 1847, p. 108, pl. 31A, fig. 4.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 8, figs. 12-16.



**Leptæna richmondensis**—Continued.

*Strophomena tenuistriata* Safford, Geol. Tennessee, 1869, p. 275, fig. 2.

*Strophomena rhomboidalis* Meek, Pal. Ohio, 1, 1873, p. 75, pl. 5, fig. 6.—Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 1.

*Strophomena tenuistriata* Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 55.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 38, figs. 12–16.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1134, figs.

*Leptæna rhomboidalis* Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 909, pl. 34, figs. 5–5d.

*Leptæna richmondensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 211, pl. 4, figs. 10a, b; *ibid.*, 17, 1912, p. 117, pl. 1, figs. 6a–c.

Richmond: Ohio, Indiana, Kentucky, and Tennessee.

**Leptæna richmondensis precursor** Foerste.

*Leptæna richmondensis precursor* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 211, pl. 4, fig. 11; Ohio Nat., 12, 1912, p. 453, pl. 22, fig. 7.

Richmond (Arnheim): Arnheim and other localities in Ohio and Kentucky.

**LEPTÆNA RUGOSA** James. See *Plectambonites rugosa*.

**LEPTÆNA SAXEA** Sardeson. See *Plectambonites saxea*.

**LEPTÆNA SERICEA** Sowerby. See *Plectambonites sericeus*.

**LEPTÆNA SERICEA** var. **RUGOSA** Meek. See *Plectambonites rugosa*.

**LEPTÆNA SORDIDA** Billings. See *Leptella sordida*.

**Leptæna(?) stelzneri** Kayser.

*Leptæna stelzneri* Kayser, Palæontographica, Suppl., 3, 1876, p. 21, pl. 3, fig. 21.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 241.

Ordovician: Guaco, Argentina.

**LEPTÆNA STRIATA** Hall. See *Strophonella striata*.

**LEPTÆNA SUBPLANA** Hall. See *Schuchertella subplana*.

**LEPTÆNA SUBQUADRATA** Hall. See *Christiania subquadrata*.

**LEPTÆNA SUBTENTA** Hall. See *Strophomena planumbona subtenta*.

**LEPTÆNA SUBTENTA** (part) Hall. See *Strophomena trentonensis*.

**LEPTÆNA SULCATA** Verneuil. See *Strophomena sulcata*.

**LEPTÆNA TENUILINEATA** Hall. See *Rafinesquina tenuilineata*.

**Leptæna tenuistriata** Sowerby.

*Leptæna tenuistriata* Sowerby in Murchison's Sil. Syst., 2, 1839, p. 636, pl. 22, fig. 2a.—Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 45, pl. 5, fig. 9.

Caradoc sandstone: Montgomeryshire, England.

Trenton (Hermitage): Clifton, Tennessee.

**LEPTÆNA TENUISTRIATA** Hall. See *Leptæna richmondensis*.

**LEPTÆNA TRANSVERSALIS** Hall. See *Plectambonites transversalis*.

**LEPTÆNA TRANSVERSALIS** var. **ALABAMENSIS** Foerste. See *Plectambonites transversalis alabamensis*.

*LEPTÆNA TRANSVERSALIS* var. *PROLONGATA* Foerste. See *Plectambonites transversalis prolongatus*.

*LEPTÆNA TRILOBATA* Owen. See *Strophomena trilobata*.

**Leptæna uncostata** (Meek and Worthen).

*Leptæna* (n. sp.?) Owen, Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, pl. 2B, fig. 3.

*Strophomena uncostata* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 335, pl. 4, fig. 11.—Whitfield, Geol. Wisconsin, 4, p. 262, pl. 12, fig. 14.

*Rafinesquina uncostata* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 15A, fig. 39; pl. 20, fig. 25.

*Leptæna uncostata* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 411, pl. 32, figs. 6–9.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 174.—Grabau and Shimer, N. A. Index Fossils 1, 1907, p. 226, figs. 271i–j.

Richmond: Savannah and Wilmington, Illinois; Delafield and Iron Ridge, Wisconsin; Spring Valley and Granger, Minnesota; Lattners, Iowa; Rapids of the Nelson River, Lake Winnipeg, Manitoba; Texas; etc.

*LEPTAGONIA* McCoy. See *Leptæna* Dalman.

**LEPTELLA** Hall and Clarke.

Genotype: *Leptæna sordida* Billings.

*Leptella* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 293; 11th Ann. Rep. New York State Geol., 1894, p. 277.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 688.

**Leptella decipiens** (Billings).

*Leptæna decipiens* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 74, fig. 67; p. 219 (adv. sheets 1862); Geol. Canada, 1863, p. 231, fig. 243.

*Leptella decipiens* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 294.

Ozarkian or Canadian: Point Levis, Quebec (Levis-Limestone No. 2); four miles northeast of Portland Creek, Newfoundland (Quebec—P).

**Leptella sordida** (Billings).

*Leptæna sordida* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 73, text fig. 66 (adv. sheets 1862); Geol. Canada, 1863, p. 231, fig. 242.

*Leptella sordida* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 293, pl. 15A, figs. 12–16.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

**LEPTOBOLUS** Hall.

Genotype: *L. lepis* Hall.

*Leptobolus* Hall, Description n. sp. Foss. from Hudson River Group, 1871, p. 3; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 226.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, Jan., p. 10.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 85.—Zittel, Handb. Pal., 1, 1880, p. 665.—Miller, N. A. Geol. Pal., 1889, p. 348.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 73, 165; 11th Ann. Rep. New York State Geol., 1894, p. 241.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 307.—Matthew, Trans. Roy. Soc. Canada, 2d ser., 8, sec. 4, 1902, p. 102.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 194.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 890.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 372.

*LEPTOBOLUS GEMMULUS* Matthew. See *Lingulella ferruginea*.

*LEPTOBOLUS GRANDIS* Matthew. See *Lingulella grandis*.



**Leptobolus insignis** Hall.

*Leptobolus insignis* Hall, Descrip. n. sp. Foss. from Hudson River Group, 1871, p. 3, pl. 3, fig. 17; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 227, pl. 7, fig. 17.—Nicholson, Pal. Province Ontario, 1875, p. 85.—Ami, Canadian Rec. Sci., 3, p. 103 (loc. occ.).—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 74, pl. 3, figs. 1–6.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 194.

Utica: Middleville, Utica, etc., New York; Ottawa, Ontario; Cincinnati, Ohio (Fulton); Macasty Bay, Anticosti (Macasty).

**Leptobolus lepis** Hall.

*Leptobolus lepis* Hall, Description n. sp. Foss. from Hudson River Group, 1871, p. 3, pl. 3, figs. 19, 20; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 226, pl. 7, figs. 19, 20.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 69, pl. 1, figs. 10, 11.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 11.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 74, pl. 3, figs. 8–10.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 911, pl. 34, figs. 6, 6a.

Trenton (Upper): Cincinnati, Ohio, and vicinity.

**Leptobolus lepis cliftonensis** Foerste.

*Leptobolus lepis cliftonensis* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 21, pl. 2, figs. 20a–c.

Trenton (Hermitage): Clifton, Tennessee.

**Leptobolus occidentalis** Hall.

*Leptobolus occidentalis* Hall, Description n. sp. Foss. from Hudson River Group, 1871, p. 3, pl. 3, fig. 18; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 227, pl. 7, fig. 18.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 3, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 194.

Richmond: Hawleys Mills, Iowa; Platteville, Wisconsin (Maquoketa); Arkansas and Oklahoma (Sylvan).

**Leptobolus walcotti** Ruedemann.

*Leptobolus walcotti* Ruedemann, Bull. New York State Mus., 42, 1901, p. 569, pl. 1, figs. 6–12.

Chazy (Normanskill)\* Mount Moreno, near Hudson, New York; Arkansas; Tennessee.

**LEPTOCÆLIA** Hall. See *Cœlospira* Hall.

**LEPTOCÆLIA DISPARILIS** Hall. See *Atrypina disparilis*.

**LEPTOCÆLIA INTERMEDIA** Hall. See *Atrypina intermedia*.

**LEPTODESMA** Hall.

Genotype: *L. potens* Hall.

*Leptodesma* Hall, Pal., New York, 5, pt. 1, Lam. (adv. copy), 1883, p. 4; *ibid.*, 1, 1884, pp. 13, 175; 35th Rep. New York State Mus. Nat. Hist., 1884, pp. 347, 406c.—Miller, N. A. Geol. Pal., 1889, p. 484.—Jackson, Amer. Nat., 24, 1890, p. 1141; Mem. Boston Soc. Nat. Hist., 4, 1890, p. 381.—Clarke, Amer. Geol., 13, 1894, pp. 286–289, figs.—Hind, Mon. British Carb. Lam., 2, Pal. Soc., 1901, p. 10.

**Leptodesma rhomboidea** (Hall).

*Avicula rhomboidea* Hall, Pal. New York, 2, 1852, p. 84, pl. 27, figs. 2a, b, c, d. *Leptodesma rhomboideum* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, 1899, pl. 2, p. 158 (gen. ref.).

Clinton: New Hartford and Sodus, New York; Arisaig, Nova Scotia.

**LEPTODOMUS** McCoy.Genotype: *L. fragilis* McCoy.

*Leptodomus* McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 66; British Pal. Rocks and Foss., 1854, p. 277.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 531.—Billings, Proc. Portland Soc. Nat. Hist., 1, 1863, p. 117.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 108.—Zittel, Handb. Pal., 2, Munich, 1881, p. 129.—Miller, N. A. Geol. Pal., 1889, p. 485.—Koken, Die Leitfossilien, Leipzig, 1896, p. 526.

**Leptodomus (Sanguinolites) aratus** Hall.

*Leptodomus (Sanguinolites) aratus* Hall, Canadian Nat. Geol., 5, 1860, p. 152.—Dawson, Acadian Geol., 2d ed., 1868, p. 603.

Silurian: Arisaig, Nova Scotia.

**LEPTODOMUS (AMPHICELIA) LEIDYI** Whitfield. See *Amphicælia leidy*.

**LEPTODOMUS NEGLECTUS** Whitfield. See *Amphicælia neglecta*.

**LEPTODOMUS UNDULATUS** Whitfield. See *Ambonychia undulata*.

**LEPTOGRAPTUS** Lapworth.Genotype: *Graptolithus flaccidus* Hall.

*Leptograptus* Lapworth, Geol. Mag., 10, 1873, p. 558.—Zittel, Handb. Pal., 1, Munich, 1879, p. 298.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 55, 1883, pp. 12, 14.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, 1896, p. 266.—Walther, Zeits. geol. Gesell., 49, 1897, p. 251.—Roemer and Frech, Leth. geog., 1, Theil, Leth. Pal., 1, 3 Lief., 1897, p. 591; Zittel-Eastman Textb. Pal., 1, 1900, p. 118.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 104.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 260; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 130.

**Leptograptus annectans** (Walcott).

*Graptolithus annectans* Walcott, Trans. Albany Inst., 10, 1883 (adv. sheets 1879), pp. 20, 35, pl. 1, figs. 2, 2a.

*Leptograptus annectans* Lapworth, Trans. Roy. Soc. Canada, 4, 1886, 183.—Ami, Can. Rec. Sci., 9, 1893, 180.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 264–266, pl. 14, fig. 5; figs. 180–183.

*Graptolithus tenuis*? Ulrich, Cat. Foss. Cincinnati group, 1880.

Utica: Holland Patent, New York; Cincinnati, Ohio, and vicinity.

*Plesiotype*.—Cat. No. 54274, U.S.N.M.

**Leptograptus flaccidus** (Hall).

*Graptolithus flaccidus* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 143, pl. 2, figs. 17–19.

*Graptolithus (Monoprion) flaccidus* Hall, 20th Rep. New York State Cab. Hist., 1868, pl. 3, figs. 10, 11; rev. ed., 1870, pl. 3, figs. 10, 11; p. 223.

*Leptograptus flaccidus* Gurley, Jour. Geol., 4, 1896, p. 99 (gen. ref.).—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 106, figs. 62a–g; pl. 14, figs. 1a–g.

Trenton (Collingwood): Lake St. John, east from Blue Point, Quebec.

**Leptograptus flaccidus spinifer** Elles and Wood.

*Leptograptus flaccidus* var. *spinifer* Elles and Wood, Mon. British Grapt., pt. 3, 1903, Pal. Soc., 1903, p. 108, pl. 14, figs. 2a–c.

*Leptograptus flaccidus* var. *spinifer* mut. *trentonensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 262, 263, pl. 14, figs. 8, 9; text figs. 176–178.

Ordovician: England (Hartfell); Glenmont and Mount Moreno, New York (Normanskill).



**LEPTOGRAPTUS FLACCIDUS SPINIFER** mut. **TRENTONENSIS** Ruedemann. See *Leptograptus flaccidus spinifer*.

**Leptograptus flaccidus trentonensis** Ruedemann.

*Leptograptus flaccidus* mut. *trentonensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 261, pl. 14, fig. 7; figs. 172-175.

Chazy (Normanskill): Glenmont and Mount Moreno, New York.

**Leptograptus macrotheca** Gurley.

*Leptograptus?* *macrotheca* Gurley, Jour. Geol., 4, 1896, p. 69.

Canadian (Levis): Point Levis, Quebec.

**LEPTOGRAPTUS SUBTENUIS** Walcott. See *Didymograptus subtenuis*.

**LEPTOGRAPTUS TENUIS** Lapworth. See *Didymograptus subtenuis*.

**LEPTOPLASTUS** Angelin.

Genotype: *L. stenotus* Angelin.

*Leptoplastus* Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 46.—Brögger,

Die sil. Etagen 2-3, Kristiania, 1882, p. 113.—Matthew, Trans. Roy. Soc.

Canada, 9, sec. 4, 1892, p. 53.—Koken, Die Leitfossilien, Leipzig, 1896, p. 20,

fig. 11, fig. 2.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 22.

**LEPTOPLASTUS (SPHÆROPTHALMUS) ALATUS** Brögger. See *Sphærophthalmus alatus*.

**LEPTOPLASTUS (CTENOPYGE) FLAGELLIFER** Linnarsson. See *Ctenopyge flagellifer*.

**Leptoplastus latus** Matthew.

*Leptoplastus latus* Matthew, Canadian Rec. Sci., 4, 1891, p. 462, figs. 1-3; Trans.

Roy. Soc. Canada, 9, sec. 4, 1892, p. 54, pl. 13, figs. 10a-c.

Canadian (Bretonian—Div. C3b): St. John, New Brunswick.

**LEPTOPLASTUS (CTENOPYGE?) LOBATA** Brögger. See *Ctenopyge? lobata*.

**LEPTOPLASTUS (CTENOPYGE) SPECTABILIS** Brögger. See *Ctenopyge spectabilis*.

**LEPTOPLASTUS SPINGER** Matthew. See *Acantholenus spinger*.

**Leptoplastus spinosus** Matthew.

*Leptoplastus spinosus* Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1894, p. 106,

pl. 17, figs. 4a-e.

Canadian (Bretonian—Div. C3b): St. John, New Brunswick.

**LEPTOPOTERION** Ulrich.

Genotype: *L. mammiferum* Ulrich.

*Leptopoterion* Ulrich, Amer. Geol., 3, 1889, pp. 235, 239.—Miller, N. A. Geol.

Pal., 1889, p. 161.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1,

1891, p. 54.—Rauff, Abh. d'math.-phys. Classe bayer Akad. Wiss., 17, 1892, p. 691.

**Leptopoterion mammiferum** Ulrich.

*Leptopoterion mammiferum* Ulrich, Amer. Geol. 3, 1889, p. 239.—J. F. James,

Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 54.

*Chirosporgia faberi* Miller, N. A. Geol. Pal., 1889, p. 156, fig. 99.—J. F. James,

Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 65.

Maysville (Corryville): Cincinnati, Ohio.

**LEPTOSTROPHIA** Hall and Clarke. See *Stropheodonta* subgenus *Leptostrophia*.

**LEPTOTRYPA** Ulrich.Genotype: *L. minima* Ulrich.

*Leptotrypa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 158.—Miller, N. A. Geol. Pal., 1889, p. 311.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 377, 455; Geol. Minnesota, 3, 1893, p. 316.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 580.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 28.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 749.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 207.

**LEPTOTRYPA ACERVULOSA** Ulrich. See *Cyphotrypa acervulosa*.

**Leptotrypa calceola** (Miller and Dyer).

*Monticulipora calceola* Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 26, pl. 1, figs. 11, 11a.—James and James, *ibid.*, 11, 1888, p. 27.—J. F. James, *ibid.*, 18, 1895, p. 87.

*Monticulipora* (*Monotrypa*) *calceola* Nicholson, Genus *Monticulipora*, 1881, p. 185, pl. 1, figs. 3-3e.

*Leptotrypa calceola* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 159.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 853, pl. 20, figs. 1-1c.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**Leptotrypa clavacoidea** (James).

*Chaetetes clavacoideus* James, Cat. Low. Sil. Foss., 1871, p. 1. (nom. nud.); Cat. Foss. Cincinnati Group, 1875, p. 1.

*Monticulipora clavacoidea* James, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 236.—James and James, *ibid.*, 1888, 11, p. 25.—J. F. James, *ibid.*, 18, 1895, p. 84.

*Monticulipora* (*Monotrypa*) *clavacoidea* Nicholson, Genus *Monticulipora*, 1881, p. 182, fig. 37.

*Leptotrypa clavacoidea* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 159.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 42.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 854, pl. 20, figs. 3, 3c.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

**LEPTOTRYPA CLAVIFORMIS** Ulrich. See *Stigmatella claviformis*.

**LEPTOTRYPA CLAVIS** Ulrich. See *Stigmatella clavis*.

**Leptotrypa? cortex** Ulrich.

*Leptotrypa cortex* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 162.

Eden (Economy): Covington, Kentucky.

*Holotype*.—Cat. No. 43677, U. S. N. M.

**LEPTOTRYPA DISCOIDEA** Ulrich. See *Amplexopora? discoidea*.

**LEPTOTRYPA? DYCHEI** Nickles and Bassler. See *Stigmatella dychei*.

**LEPTOTRYPA FILIOSA** Ulrich. See *Amplexopora filiosa*.

**Leptotrypa hexagonalis** Ulrich.

*Leptotrypa hexagonalis* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 455, pl. 36, figs. 6, 6a; Geol. Minnesota, 3, 1893, p. 317.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 208-210, figs. 112-114.

Black River (Platteville): Mineral Point, Janesville, and Beloit, Wisconsin; Calhoun County, Illinois; Minneapolis, Minnesota.

Middle Ordovician (Kuckers): Near Jewe, Esthonia, Russia.

*Holotype* and *plesiotypes*.—Cat. Nos. 44057, 57293, U. S. N. M.



LEPTOTRYPA INFORMIS Ulrich. See *Cyphotrypa informis*.

LEPTOTRYPA? IRREGULARIS Nickles and Bassler. See *Stigmatella irregularis*.

LEPTOTRYPA MACULATA Ulrich. See *Spatiopora maculata*.

**Leptotrypa minima** Ulrich.

*Leptotrypa minima* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 159, pl. 6, figs. 2-2b.

Maysville (Bellevue): Hamilton, Ohio.

*Cotypes*.—Cat. No. 43676, U.S.N.M.

LEPTOTRYPA OFFULA Ulrich. See *Paleschara? offula*.

**Leptotrypa ornata** Ulrich.

*Leptotrypa ornata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 160, pl. 6, figs. 4, 4a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

*Cotypes*.—Cat. No. 43678, U.S.N.M.

LEPTOTRYPA SEMIPILARIS Ulrich. See *Cyphotrypa semipilaris*.

**Leptotrypa? sphæron** (Hall).

*Paleschara? sphæron* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 8, figs. 14, 15.

*Paleschara? (Chaetetes?) sphæron* Hall, *ibid.*, mus. ed., 1879, p. 121, pl. 8, figs. 14, 15; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 247, pl. 7, figs. 14, 15.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 592, fig.

*Leptotrypa sphæron* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 299.

Niagaran (Waldron): Waldron, Indiana.

LEPTOTRYPA STIDHAMI Ulrich. See *Cyphotrypa stidhami*.

LESUEURILLA Koken. See *Maclurites Lesueur*.

**LEVISIA** Walcott.

Genotype: *Agraulos agenor* Walcott.

*Levisia* Walcott, Smiths. Misc. Coll., 57, no. 4, 1911, p. 86; Cambrian Faunas of China, Carnegie Institution, 3, 1913, p. 177.

**Levisia nasuta** Walcott.

*Levisia nasuta* Walcott, Smiths. Misc. Coll., 57, 1911, p. 87, pl. 17, fig. 5, and figs. 7, 7a; Cambrian Faunas of China, Carnegie Institution, 1913, p. 178.

Ozarkian? (*Levis-erratic*): Point Levis, Quebec.

**Levisia richardsoni** Walcott.

*Levisia richardsoni* Walcott, Smiths. Misc. Coll., 57, 1911, p. 86, pl. 17, figs. 4, 4a; Cambrian Faunas of China, Carnegie Institution, 1913, p. 178.

Ozarkian? (*Levis-erratic*): Point Levis, Quebec.















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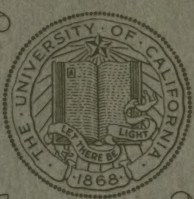
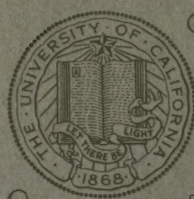
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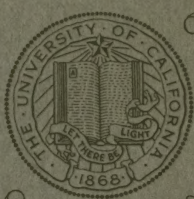
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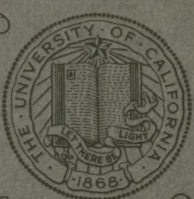
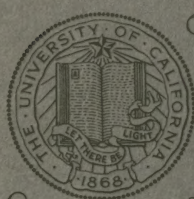
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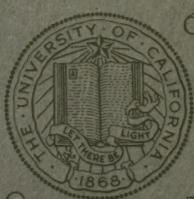
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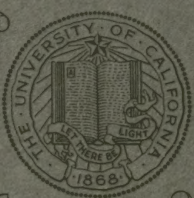
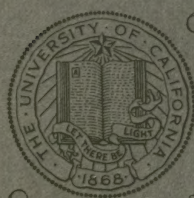
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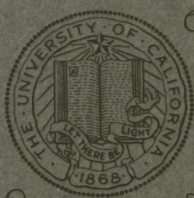
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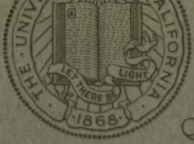
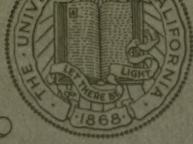
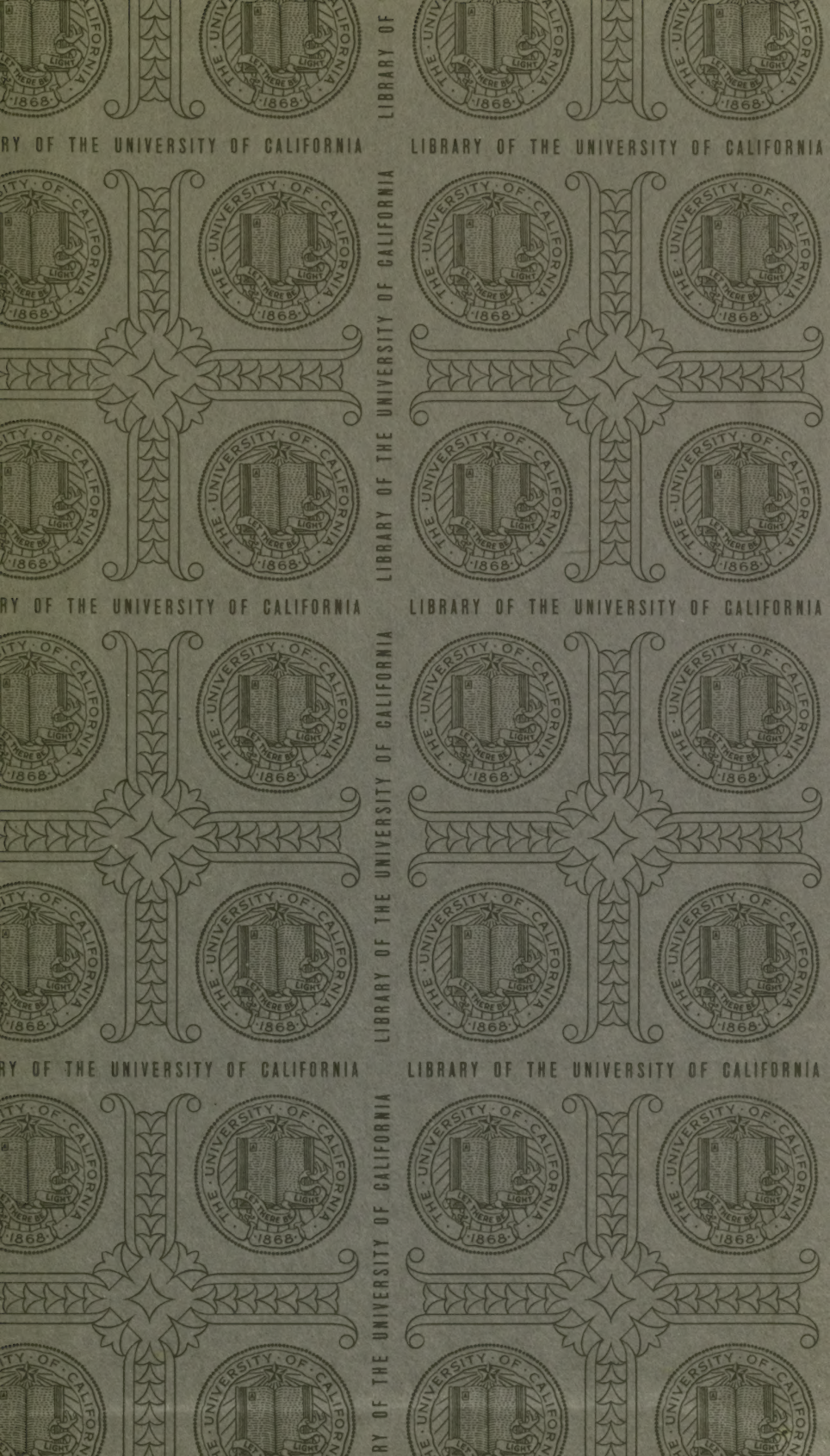
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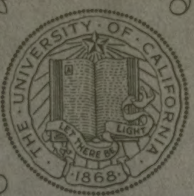
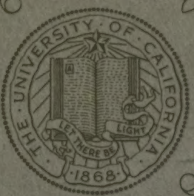
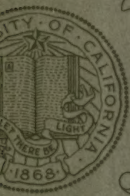
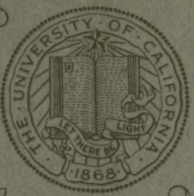
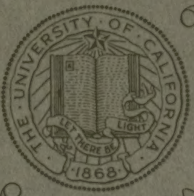
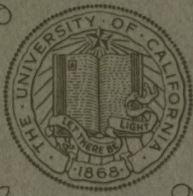






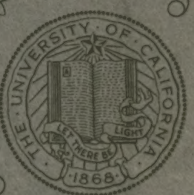
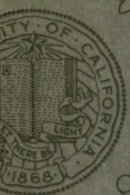
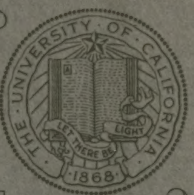
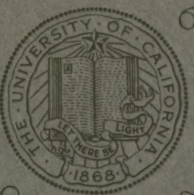
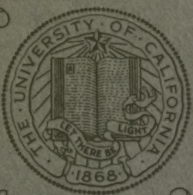
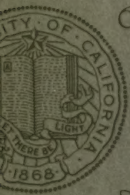
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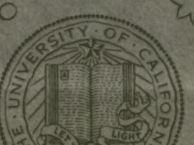
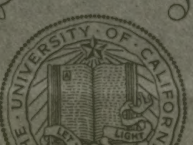
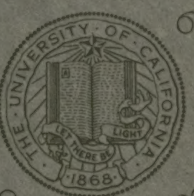
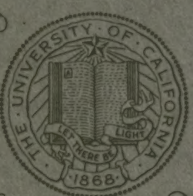
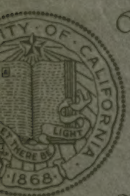
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